PROVINCE OF ALBERTA

DEPARTMENT OF AGRICULTURE

SEED AND WEED BRANCH

BULLETIN No. 2

WEEDS OF ALBERTA

BY

J. D. SMITH

PUBLISHED BY THE DIRECTION OF THE

HON. DUNCAN MARSHALL, MINISTER OF AGRICULTURE

Edmonton:
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HONOURABLE DUNCAN MARSHALL,
Minister of Agriculture,
EDMONTON.

SIR:—

I have the honour to submit herewith Bulletin No. 2 of the Seed and Weed Branch, entitled, "Weeds of Alberta," by J. D. Smith, Superintendent of the Seed and Weed Branch of the Department, and to recommend that it be published for general distribution.

I have the honour to be, Sir,
Your obedient servant,
H. A. CRAIG,
Deputy Minister.

Department of Agriculture,
Edmonton, May 26th 1916.

PREFATORY NOTE

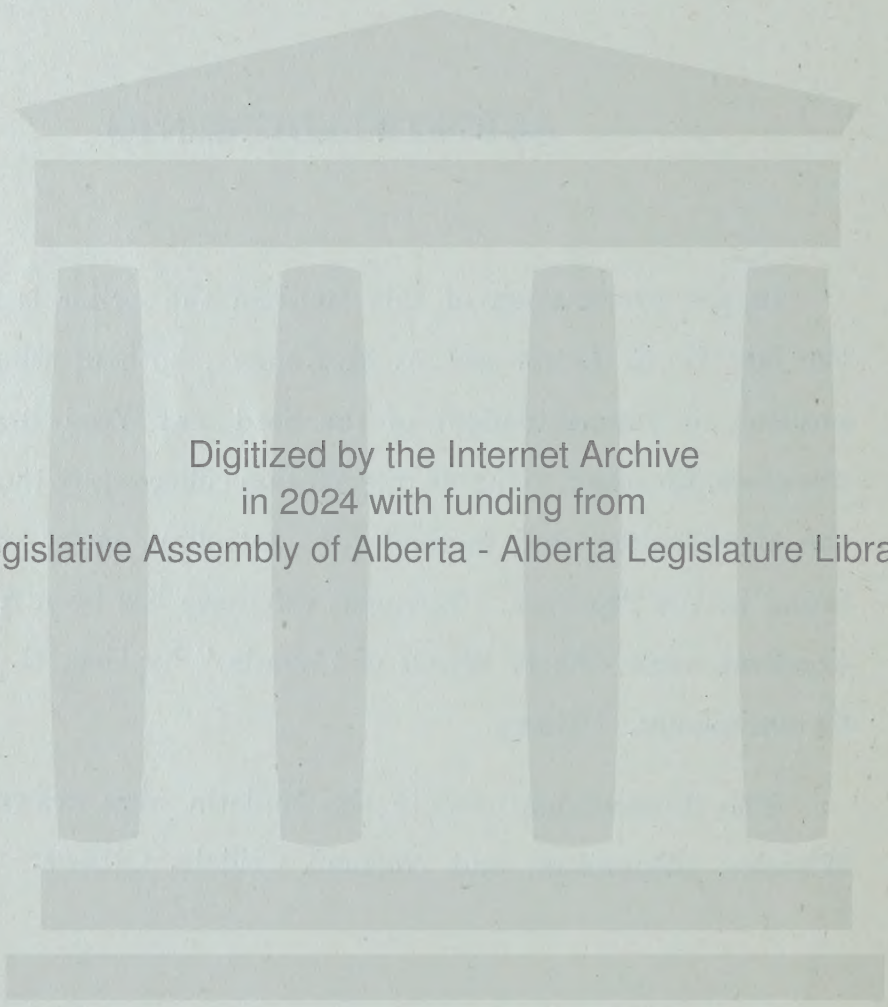
This Bulletin is compiled with the hope that it will be of assistance to the people of Alberta in the identification and eradication of the more common weeds of the Province. Only such plants as are considered harmful to agriculture are dealt with. The information offered is the result of several years' experience in weed-work in the Province. It is hoped that it will prove of a practical value to those interested in agriculture. The colored illustrations show those plants that are known to be of a highly noxious nature, and that are known to be giving the farmers serious trouble. The drawings are of plants that are not specially troublesome, but which it will pay to keep in check. The reader is requested to note that whenever, in the text, such a parenthetical reference occurs as, for example, "(plate 2, fig. 14)," the plates thus referred to are those which appear at the **end** of the book.

J. D. SMITH.

ACKNOWLEDGMENTS

In the preparation of this Bulletin the writer is indebted to the late C. E. Lewis and A. McKenney, both of whom held the position of Superintendent of the Seed and Weed Branch in the Province, for much valuable information collected by them regarding the classification and methods of controlling many of the weeds found in the Province. Frequent reference has been made to that excellent work "Farm Weeds of Canada," by Geo. H. Clark, Seed Commissioner, Ottawa.

The illustrations used in the Bulletin were drawn by A. W. Wheeler, Edmonton, and Norman Cridale, Ottawa.



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INTRODUCTORY

The matter of annual losses caused by weeds on the farms of Alberta needs more serious consideration than it has thus far been given. Governments may enact and are enacting stringent laws covering the control of weeds, but unless the farmers of Alberta join hands with the Department in a vigorous effort to combat weeds, they will continue to be the most serious difficulty with which the farmer has to contend.

WEEDS IN THE PRAIRIE PROVINCES

Many farmers wonder why weeds are more troublesome in the western provinces than they are in the older settled ones to the east. The chief general reason for this condition perhaps is that up to the present farming has had a strong speculative rather than home-making aspect in some parts of the Province. In every new country conditions have been somewhat the same, and the result generally is that it is the third occupier of the land who undertakes to build himself a permanent home, and endeavors to study the conditions about him. When these changes arrive, people can hope and expect to meet the weed situation.

Other reasons for trouble with weeds are connected with local climate. Our dry autumns do not cause the germination of seeds after harvest and the subsequent killing by frost. Many of our weed seeds remain at or near the surface of the soil in the drier parts of the Province, uninjured over winter, and are ready to start with the crop in the spring. The high winds in the area characteristically affected by the Chinook, help to distribute many different kinds of weeds far from where they have grown and matured. These are such weeds as have parachute equipment and the tumbling habit. The absence of fences or at least of close-woven fences makes the work of the winds in seed distribution still easier.

Farmers pay too little attention to the weeds growing in their crops. Because some of these weeds are unfamiliar, the exact recognition of weeds is thought to be difficult. There are, however, only a few that give serious trouble. Why, then, are not these few specimens as familiar to the farmer as are such plants as wheat, oats, barley, etc. ?

Agriculture in Alberta still is in an undeveloped condition. So is the matter of weed control. If we hope to make suitable progress in crop production the weed difficulty must be effectively met.

WHAT IS A WEED?

There are various definitions of the term weed. From the farmer's standpoint a weed is perhaps best described as "any injurious, troublesome or unsightly plant that is at the same time useless or comparatively so." The farmer knows a weed as a plant which greatly interferes with the growth of a crop by drawing moisture and fertility from the land; which produces seed in the grain, practically valueless as feed and besides causes heavy dockage at the elevator.

LOSSES DUE TO WEEDS.

Probably the greatest loss by weeds is the extra cost of cultivation. They necessitate greater expenditure in machinery, horses and labor, and may prevent the growing of grain or fodder crops on land that otherwise would be productive land.

Weeds rob the soil of plant food and of moisture, and thus increase the effects of drought by taking up water from the soil and wasting it by evaporation.

Weeds crowd out the cultivated crop and increase the cost of binding, threshing and marketing. Many binders are broken through the harvesting of coarse weeds. The hauling to the elevator and the extra freight from elevator to terminal points are heavy losses to the farmer.

Weeds attract injurious insects and harbor fungus diseases. In Southern Alberta, where Tumbling Mustard and Russian Thistle are left standing over winter, attacks of cut-worms and wire-worms are quite common.

The ultimate effect of weeds is to greatly reduce the value of the land. In some instances land has become valueless through being overrun with weeds.

WHY CERTAIN WEEDS ARE TERMED NOXIOUS.

Vigorous Growth. Weeds of fast growth crowd out the crop, absorb large quantities of moisture, reduce fertility, and shut out the sun.

Production of Large Quantities of Seeds. Although the vigorous growers may often be easily destroyed, they keep the soil constantly filled with fresh seed.

Indestructibility of seed. Certain seeds are so well protected with an oily coating that they remain in the soil for many years, and still retain sufficient vitality to germinate when brought to the surface of the soil or within reach of air.

Tumbling habits. Certain weeds break off readily at the ground and roll over the land before the wind, distributing seed as they go.

Creeping rootstocks. Many weeds, such as Perennial Sow Thistle, Canada Thistle, Blue Lettuce, Poverty-weed, Quack-grass, Bindweed, etc., are propagated by means of underground stems as well as by seed. These rootstocks are difficult to destroy and spread with remarkable rapidity through the soil, sending up new shoots at short intervals, which soon cover the ground and choke the crop.

HOW WEEDS SPREAD.

Many of the noxious weeds found in the Province have been introduced from other places. Weeds may be brought in and distributed in various ways.

By man. He is largely responsible for the distribution of weeds, chiefly through the agency of impure seed and feedstuffs. Many weeds have made their way into the province by litter used in packing house-furniture and utensils.

Sowing grain that is infested with weed seeds has caused the greatest distribution of weeds. Grain inspected in the drill has been found to contain over twenty thousand noxious weed seeds per bushel.

Ranchers and railway contractors have been responsible for the importation of weed seeds in their feed, both hay and oats, which has been brought in from other countries or provinces.

Weeds are spread by threshing machines, grain racks and various kinds of farm machinery.

By animals. Farm stock, with the exception of sheep, should not be allowed to eat weed seeds or grain that contains weed seeds, as the germinating power of weed seeds is not destroyed in passing through the intestines of these animals. In cases where it is necessary to feed dirty grain, the stock should be kept in enclosures, and the manure should be well rotted before being used, or it should be destroyed by burning.

A great deal of trouble in Alberta has been caused by farmers allowing stock to eat the screenings left by threshing machines, or to eat dirty straw stacks, and then allowing the stock to run at large.

By water. Streams, rivers and irrigation ditches carry a great quantity of weed seeds from one district to another. Attention should be given to weeds growing on the banks of rivers and

ditches and, if possible, old weeds which lodge in them during the winter should be burnt.

By wind. Weed seeds are often carried long distances by high winds, both from finely surface-cultivated land, and over the snow in winter. The seeds of such weeds as Perennial Sow Thistle, Canada Thistle, Blue Lettuce and Dandelion are carried in the wind by the tufts of silky hair attached to them. Other plants such as Tumbling Mustard, Russian Thistle and Tumble-weed, break off at the base of the stem and roll over the ground for long distances, distributing their seed on the way.

CLASSIFICATION OF WEEDS.

To exterminate weeds it is necessary to know the habits of growth of the plants to be destroyed. It is not sufficient to know the plant or its habits as an individual. It should be known as one of a family of similar life habits. When plants are known as members of a class, the knowing of one helps us to associate it with the others and conversely the knowledge of the characteristics and habits of a family enables us to identify and know the habits of a new or old individual and also to know at once the steps necessary to combat it. In the eradication of weeds climatic and soil conditions should be taken account of.

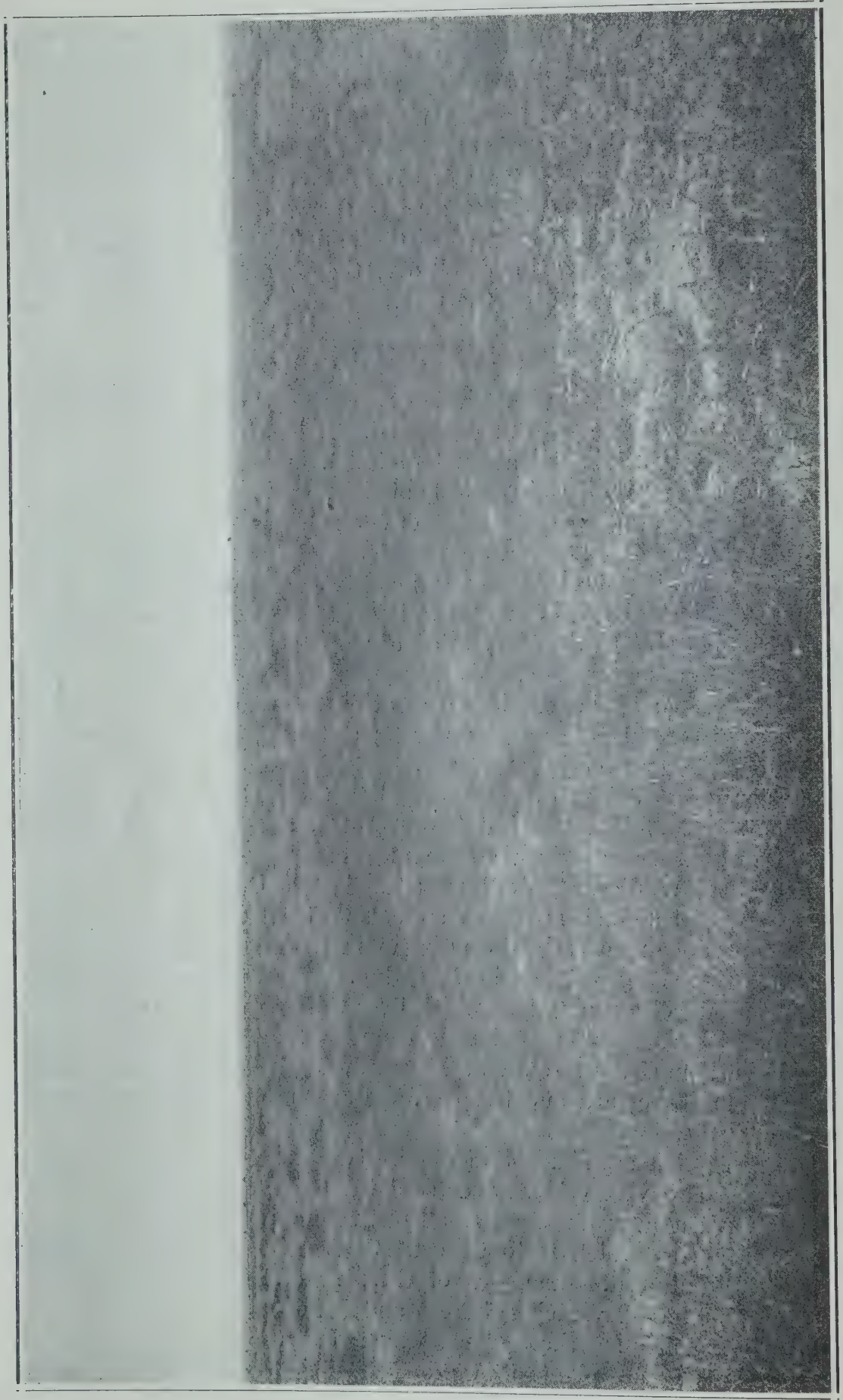
Weeds may be considered as belonging to one of the following classes : annuals, or one year plants; biennials, or two year plants; perennials, or every year plants.

Annuals are plants that complete their growth in one year. They generally have small fibrous roots, and usually produce a large quantity of seed. Examples of this class are: Lamb's Quarters, Wild Mustard, Ragweed and Wild Oats.

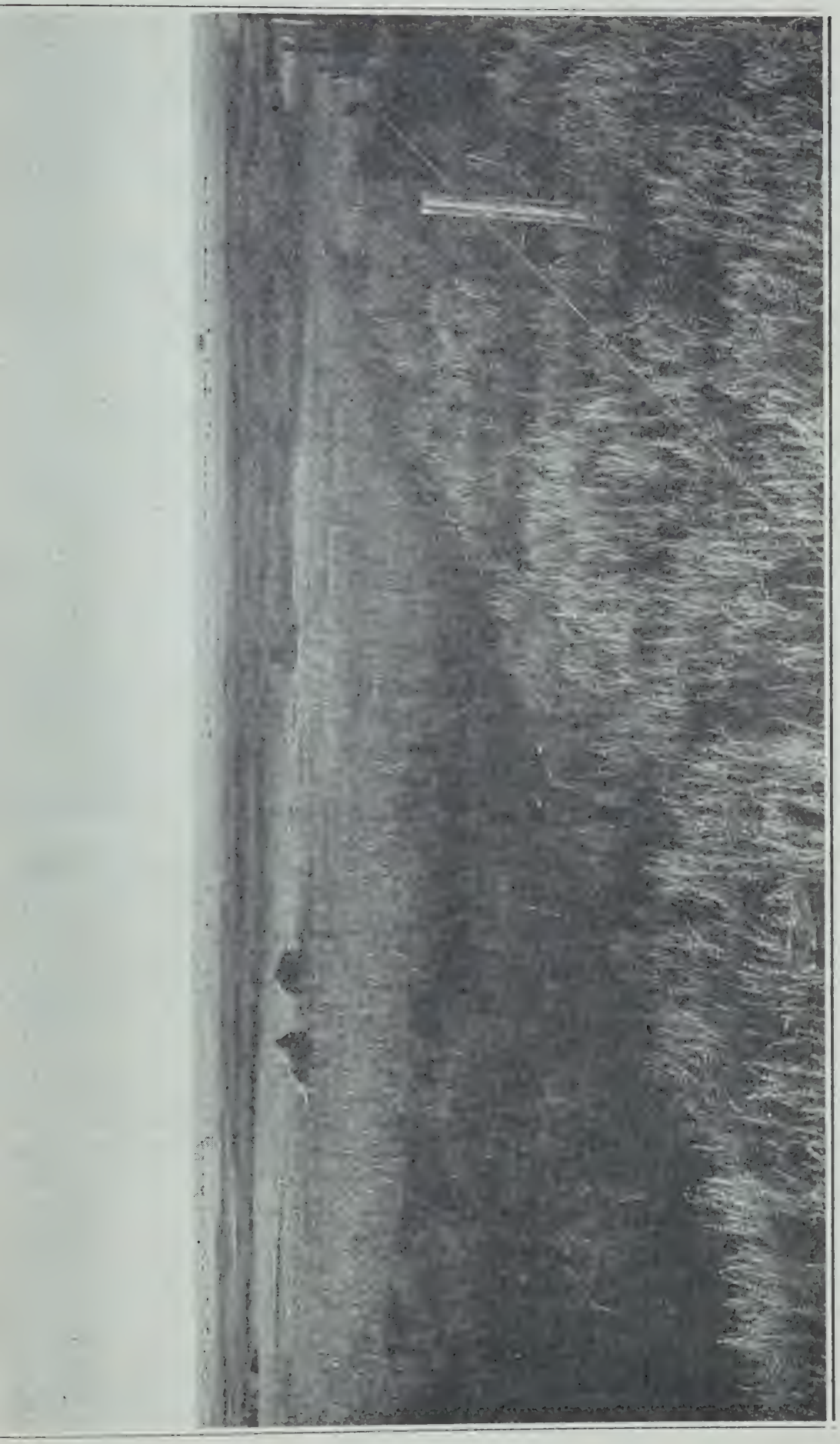
Winter annuals are hardy annuals that live through the winter, and produce seed early the next summer. They are true annuals when the seed germinates in the spring. When the seed germinates and produces a small plant which lives through the winter ready to produce seed early the following summer, they are then classed as winter annuals. Hare's Ear Mustard, Stinkweed, Ball Mustard, Tumbling Mustard and Shepherd's Purse are examples of winter annuals.

Biennials are plants that require two seasons to complete their growth, and very seldom bear seed the first year, the first season being spent in producing a small plant and storing up a supply of nourishment, which is to be used the second year in producing flowers and seed. Examples of these are: Tansy Mustard, Blue Bur, Common Evening Primrose and Burdock.

Perennials are those plants which continue to grow from year to year, and are plants that propagate both by seed and running



NEGLECTED SUMMER-FALLOW



CROP GROWN ON THE NEGLECTED SUMMER-FALLOW WHICH IS SHOWN ON OPPOSITE PAGE.

rootstocks. These running roots vary in their position, some travelling quite close to the surface of the ground, while others run more deeply. They are often classed as shallow and deep-rooted perennials. Canada Thistle, Perennial Sow Thistle, Blue Lettuce, and Wild Sunflower are examples of the deep-rooted perennials. Couch-grass and Pasture Sage are examples of the shallow-rooted perennials.

GENERAL PRINCIPLES OF ERADICATION.

There would be very few weeds if more attention were given to the sowing of clean seed. The first principle of weed eradication is to secure seed grain that is clear of foul seeds.

Farm animals have done a great deal to spread weeds, therefore we should examine the feed of the working-horse. See that cattle do not eat screenings and run at large over the farm. Screenings may be fed to hogs if ground finely and soaked for forty hours before feeding.

Never allow weeds to ripen seeds. If plants do succeed in maturing they should be pulled and burned at once.

Be constantly on the alert for new weeds, so that they may not be allowed to establish themselves on the farm.

All weeds can be destroyed by the use of ordinary and suitable farm implements, together with careful and persistent effort on the part of the farmer.

It is necessary to know the stage at which a plant is weakest, because at such time the work of eradication will be simplified considerably.

The climatic and soil conditions peculiar to different districts help to determine the best methods of weed eradication. What may prove successful in one place may fail in another.

Annual weeds are not hard to exterminate. Any system of germinating and then destroying by cultivation should soon clean the land of such weeds. Harrowing after the crop is up, from two to three inches high, will give good results.

Winter annuals can be eradicated to a great extent by following the system mentioned for annual plants, with the exception that late fall cultivation is necessary, also the thorough working with a wide-shear cultivator followed by the harrow in the spring. This should be done as early as possible and again just before seeding.

Biennial plants can be destroyed best by ploughing. Cutting these weeds two or three times during the season will commonly prove effective. They should be cut as close to the ground as possible. In this way the crown of the plant may be destroyed, which results in the plant dying immediately. If cut above the crown it will likely shoot up extra branches, hence the necessity of

cutting often. In badly infested fields summer-fallowing is recommended.

Perennial weeds are the most difficult of all weeds to destroy. Improper cultivation will only tend to increase the number of plants. It is with this kind of weed that careful consideration of climatic and soil conditions must be given. It is almost impossible to eradicate perennial plants in a wet season, because there are only two ways of destroying them, viz.: to surface cultivate, which will prevent the plant from producing the leaves whereby its life is sustained, or to cultivate the running rootstocks to the surface where they will be killed by the sun, or where they can be raked up and burned. This being the case, it is necessary to select, if possible, a dry and hot period in which to do the work.

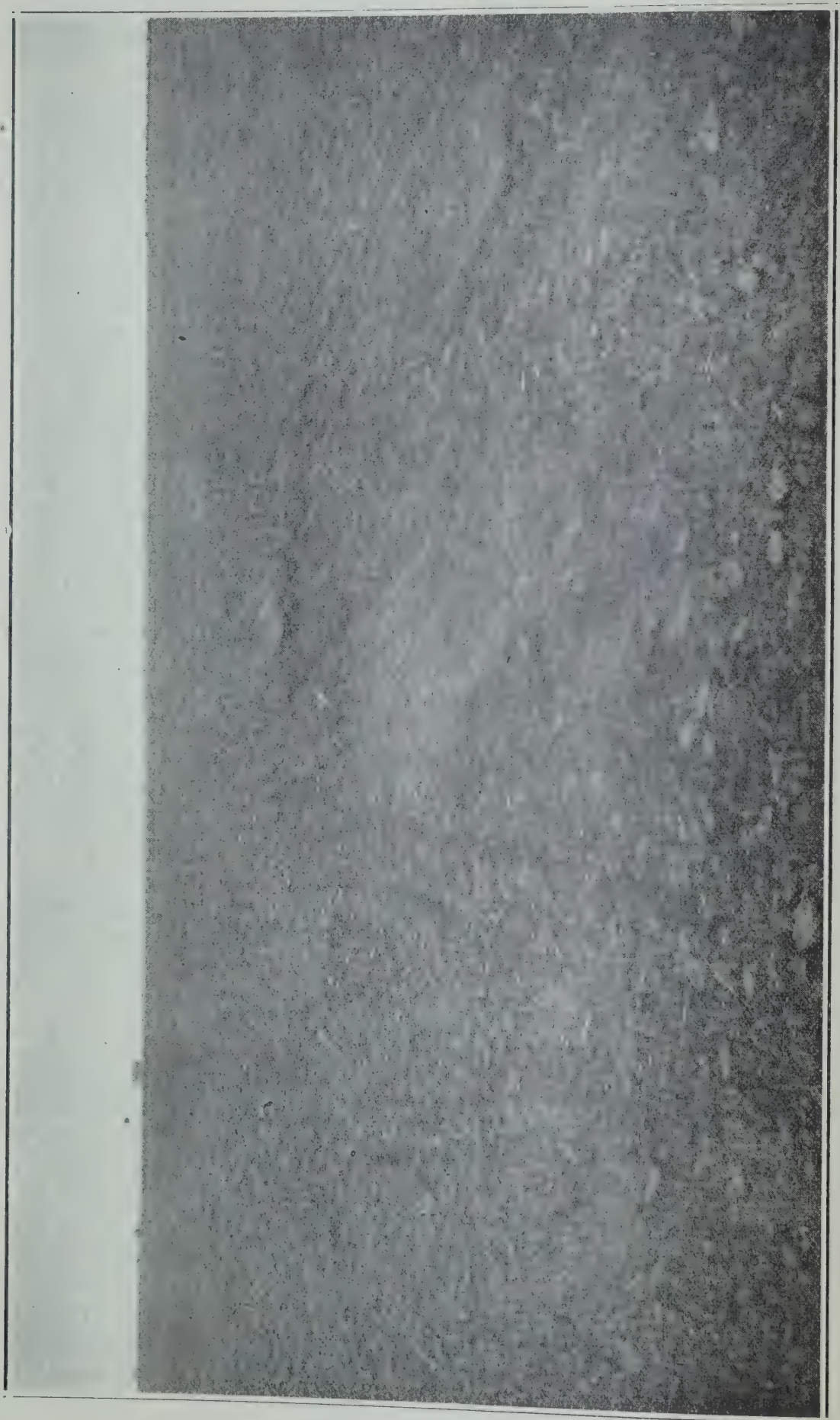
It should be noted that continuous ploughing of land that is infested with perennial plants is not advisable. The plough carries the underground rootstocks from one part of the field to the other, often infecting clean parts, as these roots will start to grow immediately. Harrowing frequently has the same effect. A disc likewise only cuts the roots into small pieces, which in a short time produce new plants.

Once the ground is ploughed it should not be ploughed again for some time, but should be cultivated at intervals with a spring-tooth, duck-foot cultivator until the weed is sufficiently destroyed to make the land fit for a crop. The crop should be of some green feed nature, as early cutting is desirable. For deep-rooted perennials the ploughing ought to be as deep as possible, while on the other hand for shallow-rooted perennials it should be just deep enough to get below the running roots.

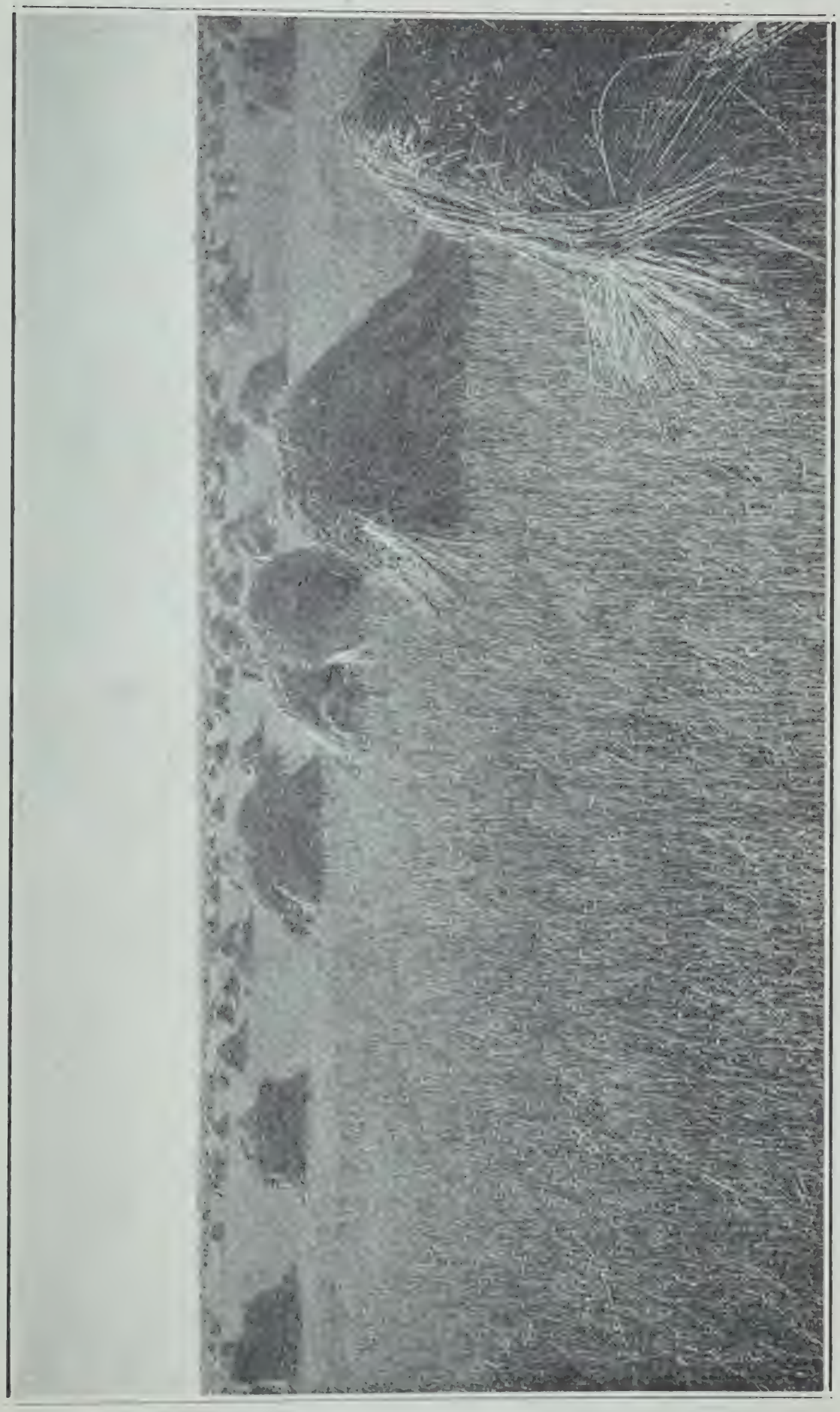
To control perennial plants growing in sod or prairie land, it is advisable to cut them as close to the ground as possible, and about the time the plant is producing its first flower, as this is its weakest stage.

SUMMER-FALLOW.

Summer-fallowing is the most effective means of controlling weeds, and it has also been found by the best farmers in certain parts of the province to be the only means of storing the moisture and retaining the vitality of the soil. In such districts, however, where strong summer winds are common, and the soil is of light nature, summer-fallowing has not proven wholly satisfactory. This does not relate to the matter of eradicating weeds, but to the drying out of the soil, and to its drifting away in alarming quantities. Again, in other districts where the soil is of a heavy, black humus nature and where the rainfall is heavy, summer-fallowing may result in the loss of a crop. It may either grow so rank that it



WELL-WORKED SUMMER-FALLOW.



WHEAT CROP GROWN ON THE WELL-WORKED SUMMER-FALLOW WHICH IS SHOWN ON OPPOSITE PAGE.

lodges or may continue its growth until frosted. In districts where the latter conditions prevail, the best method of eradicating weeds is to adopt some short rotation of crops.

Until quite recently, little summer-fallowing has been done in the Province, although many farmers professed to be undertaking this work on part of their farms. Owing to a want of thoroughness in their work they have had in the fall, instead of a clean soil, a first-class crop of weeds; consequently, what work they have done has been lost.

The amount and nature of the cultivation of a summer-fallow depends upon the habit of the weeds, the kind of soil, and the climatic conditions. It is therefore impossible to set any hard and fast rule as to methods of cultivation on work of this kind. With this in view the writer submits the following two methods of summer-fallowing, which have been found to be satisfactory generally in this Province:—First, to work for the control of such weeds as are classed as annuals, winter annuals, and biennials; second, for weeds belonging to the perennial class.

Summer-fallowing land that is infested with such weeds as those which only propagate by seed, should consist of a series of cultivations that will bring all the seed in the ground to the surface whereby it will germinate. It can then be destroyed by surface cultivation. Immediately after harvest the land should be cultivated thoroughly, then again before winter sets in. In the spring the harrow should be run over it once or twice. Ten days later it can be ploughed shallow and worked down so that all seeds will have a good seed bed and germinate quickly. These weeds should be allowed to grow until the other seeding is completed, then the land should be ploughed deep, at least as deep as the land has ever been ploughed before, and surface cultivated for the remainder of the season. In this plan the surface seed is germinated, then with the shallow ploughing the medium depth seeds are brought to the surface to germinate. The last deep ploughing should bring up any seeds that have been turned down previously. If this system has been carried out thoroughly, there is no reason why the land should not be clear of noxious weeds.

To eradicate perennial plants, it is essential to either starve the plant out or to bring the underground rootstock to the surface, where it will be killed by the hot sun or gathered and burned. All plants get growth by the elaboration of plant food in the leaves. If the leaves are destroyed as soon as they appear the plant must die.

In summer-fallowing land to eradicate perennial weeds, the land should not be ploughed more often than is necessary to keep the soil in working condition for the cultivator. Ploughing after harvest has had good effects in destroying such weeds, as the plant is weak at this season of the year, but, as ploughing immediately

CROP OF CORN GROWN IN SOUTHERN ALBERTA.

This crop is a profitable and economical forage crop, adds to the cultivated area in a rotation and does not exhaust the moisture resources of the soil to the extent of making a subsequent cereal crop unsuccessful.

after harvest is not generally possible in the Province, it should be left until spring. The ploughing should be sufficiently deep to ensure that all the running rootstocks are turned up. This should be followed by a thorough cultivation with a duck-foot cultivator at intervals throughout the season. As many roots should be brought to the surface as possible, gathered with a horse-rake, and burned or hauled away. The disc should not be used, but only the harrow, and this when absolutely necessary.

ROTATION OF CROPS.

The carrying out of systems of rotation suited to the character of the climate and soil of given districts is highly desirable for both general and special reasons. Under skilful rotation of crops the fertility of the land is conserved and the physical condition of the soil is improved by variety in cropping and cultivation. It is likewise safer in a business way than the single crop system and is favorable to the carrying on of live stock enterprises. These benefits are favorable likewise to weed eradication work directly and indirectly. Good conditions of cultivation and heavy crops help to keep down weeds and changes from grain to grass and from grass to summer-fallow or cultivated crops make it difficult for weeds to become established as they do, for example, under continuous grain cropping.

To destroy weeds, probably the best rotation possible is one of three years' duration, and with this in view the writer submits the following three methods:—

(1) Cultivate late in the spring. Seed thickly to oats. Cut the crop for green feed. After the crop is harvested cultivate immediately. The following spring, plough early and work down. Allow this to stand two weeks if the season is favorable, then seed lightly to oats and timothy. The timothy may be harvested or pastured for a period of two or three years.

(2) Cultivate during the early part of the season until about August 1st, and then seed to fall rye. This can be pastured during the fall and succeeding spring, and afterwards ploughed up and seeded to rape. The date of seeding to rape will depend considerably on the nature of the season. Generally the month of July is suitable. After the rape is pastured off, the land should be ploughed either the same fall or early in the coming spring, worked well, and seeded thickly to barley or oats.

(3) Divide the field into two parts, work thoroughly well into the spring and seed one part to corn, the other to rape. The rape can be pastured by sheep, hogs and cattle, while the corn can be harvested. After these two crops are pastured and harvested, the land should be ploughed early the next spring, and worked at intervals until August 1st, then seeded to fall rye, which may be pastured for twelve months, then ploughed and fall summer-fallowed, and seeded to spring wheat the following year.

SHEEP DESTROY WEEDS.

In a country which is so well adapted to the raising of sheep as Alberta is, it is unfortunate that this kind of farm stock is not given more attention, both by the large and small farmer. No farm should be considered equipped unless it has some sheep, especially in districts where grain-growing is carried on. Many farmers could save the wages of one hired man, and reduce their power and implement expenditure by forty per cent. if they maintained an average of fifty sheep per quarter section of land.

"When an abundance of succulent pasture of the finer grasses is provided, weeds can scarcely be said to be favored by sheep as a staple part of their diet. Sheep will, however, even when good pasture is provided them, vary their diet by nipping off seedling plants or the fresh-growing parts, and the bloom with its contents of sweets from older plants of many of our common weeds. When their pasture is depleted, sheep feed readily on Wild Mustard, Ox-eye Daisy, Yarrow, Plantain, Perennial and Annual Sow-thistle, Wild Vetch or Tare, Docks, Sorrel, Lamb's Quarters, Milkweed, Ragwort, Burdock and Shepherd's Purse. In fact, there are few weeds that sheep will not eat to the extent of preventing them from seeding, if there is not enough of their favorite grasses to satisfy them. It is only when the supply of food is unusually short that sheep will feed on plants having leaves and stems covered with bristly hairs or spines, or with a flavor that is obnoxious to them. When the plants are young and tender, however, sheep have been observed to eat such weeds as Ragweed, Blue-weed, Cockles, Orange

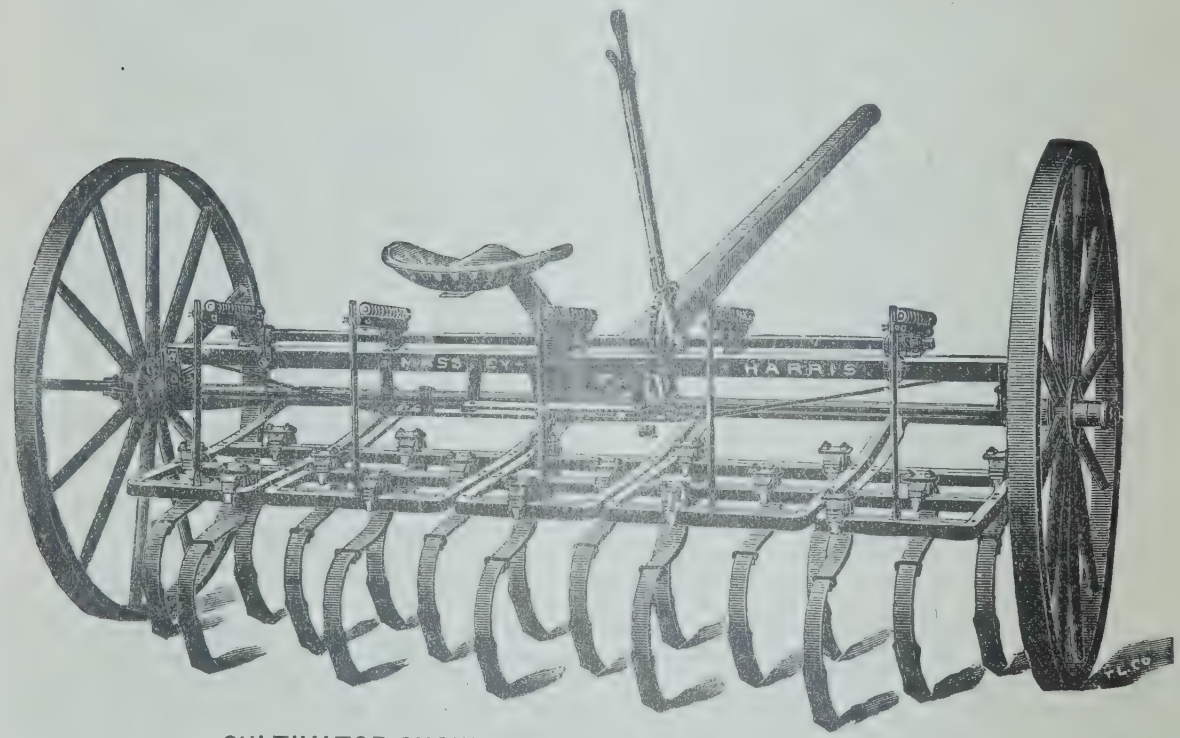
CLEANING UP AS THEY GO.

Hawkweed, Toadflax, and others that are bristly and have a pungent flavor.

"Thorough cultivation with a systematic rotation of crops, combined with the maintenance of as many sheep as can be kept to advantage, is a certain and profitable means of keeping weeds under control." "Farm Weeds of Canada."

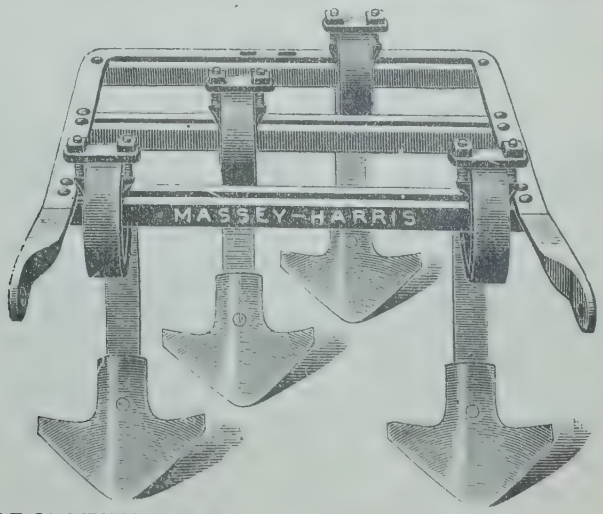
FARM IMPLEMENTS TO DESTROY WEEDS.

The successful eradication of weeds depends to a great extent on the kind of implements used. Perennial plants cannot be eradicated economically with such implements as the disc and



CULTIVATOR SHOWING NARROW-SHEAR ATTACHMENT.

harrow. In fact, these implements tend to increase the number of some weeds rather than exterminate them. The spring-tooth cultivator has proved to be the only implement that will eradicate



SECTION OF CULTIVATOR SHOWING BROAD-SHEAR ATTACHMENT.

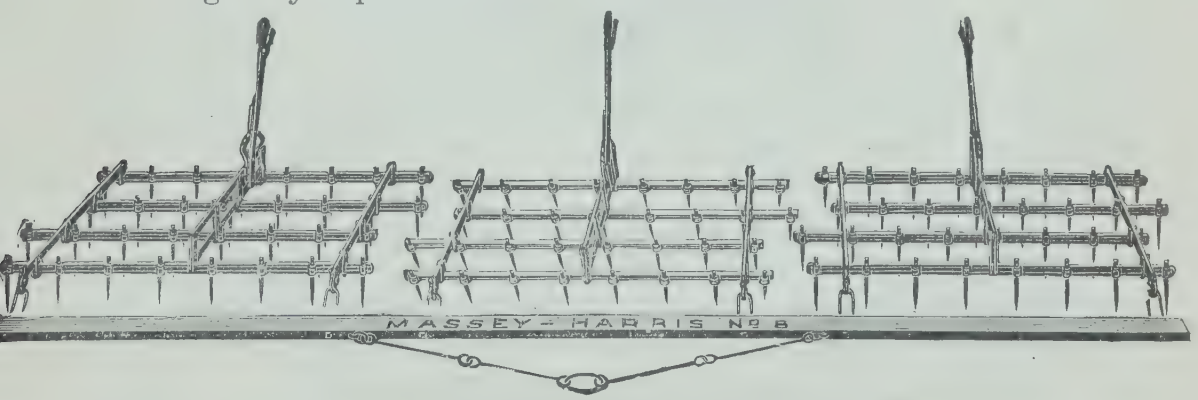
plants with underground rootstocks satisfactorily. When this kind of a cultivator is fitted with narrow shears it is excellent for loosening up hard-packed soil, and will do good work if used immediately after harvest, or in early spring, to make a suitable mulch in which the surface seeds may germinate.

When fitted with the broad-shear attachment as shown in the cut on previous page, it is a useful implement for use in any spring or summer-fallow work, as it not only cuts off the straight roots of the annual weeds, but also cuts under the running rootstocks of the perennial plant, bringing them to the surface where they may be killed by the sun, or may be gathered by a rake and burned.

The cuts on previous page show the type of implement suited to this work. The curved tooth is to be preferred to the straight or upright tooth. The curved tooth will leave more of the underground rootstocks on the surface than will the straight tooth, thus making the work of this type of cultivator more effective.

THE HARROW.

Harrowing crop from one to three times after it is up two or three inches high, has proved to be one of the best methods of keeping weeds in check, especially annuals, winter annuals and biennials. Usually these weeds come up a few days later than the grain. When the grain is about two inches high, the weeds are just in the two-leaf stage, hence very tender, and very easily destroyed. Sometimes the heavy straight tooth harrow is too severe, and the tilting harrow shown below will do the work of killing the seedling weeds just as well. This harrow can be regulated by the lever to go any depth desired.



THE TILTING HARROW.

FANNING-MILLS.

The first step to be taken to clear the farm of weeds is to sow and feed clean grain. No farmer can hope to keep his farm clean if he persists in sowing and feeding grain direct from the thresher. The writer has inspected grain in a seeder which contained over twenty thousand noxious weed seeds per bushel. What can be expected from such seed? In districts where the farmers have good fanning-mills, and are cleaning their grain thoroughly before

feeding or sowing, weeds are not generally giving serious trouble. There are now manufactured two mills, one to clean the dirt and straws out, and the other to grade the grain as to size of kernel and take out Wild Oats. Grain run through both these mills from one to three times can be made practically clear of any noxious weed seeds. The price of the two machines runs from sixty to one hundred dollars, according to size. Farmers sometimes complain that these machines will not do the work as represented. This may be the case where they are carelessly operated. If the mills are taken good care of, kept dry, and regulated and operated according to instructions forwarded with each mill, they will be found to do reasonably good work, and prove to be a highly profitable investment.

"Weeds most numerous grow from seed."

KILLING WEEDS BY CHEMICALS.

Experiments in spraying to eradicate weeds in grain fields have been conducted by this Department. The results were that such weeds as Ball Mustard, Wild Mustard, Wild Radish, Pigweed Lamb's Quarters, etc., were readily killed by from one to two treatments with a solution made up of one hundred pounds of iron sulphate to fifty gallons of water. Tumbling Mustard was experimented on, but the results were not so satisfactory. The spray evidently killed the leaf of this weed, but the great vitality of the root and crown nourishes new stems which produce well-matured seed. Spraying experiments have been made in parts of the United States on such plants as Stinkweed, Canada Thistle and Couch-grass, but from reports the results were not entirely satisfactory. When solutions strong enough to kill the plant down to the root were used the grain crop was invariably injured. The statement below is from the report of the Montana Agricultural College, Bozeman:—

"It is claimed that under certain conditions Stinkweed may be killed by spraying with iron sulphate or other chemicals while the grain crop in which it is growing is practically uninjured. This feat may occasionally be accomplished, but we believe it is not yet on a basis where farmers can practise it successfully."

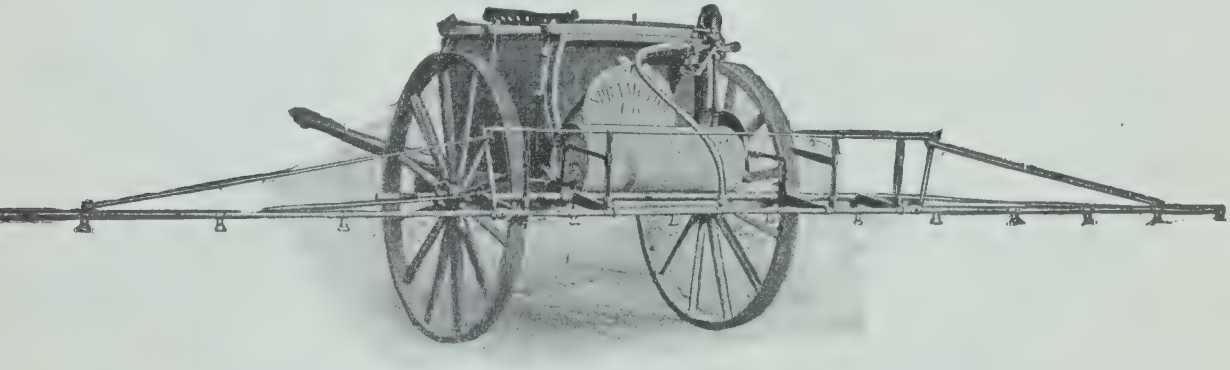
In Press Bulletin No. 27, published by the North Dakota Agricultural Experimental Station, Mr. H. L. Bolley makes the following statement:—

"Careful field trials have been made upon the various grain crops, meadow grasses and forage plants and against the most destructive of weeds in the cereal fields with the result that many persons have been convinced that in this method of weed eradication the farmer will have very efficient help. In general, it may be taken for granted that the increase in crop, straw and grain, because of treatment, will be in close approximation to the weight

of weeds produced on unsprayed areas. In the weedier regions of the Red River Valley and in similar areas, this increased yield from field spraying far exceeds the cost of the work. It has also the merit of preventing the introduction of more weed seeds into the grain and soil to cause trouble in future crops."

For spraying such weeds as the Mustards, Pigweed, Lamb's Quarters, Pepper-grass, etc., the following mixture is recommended:—

When plants are young and tender, use from seventy-five to one hundred pounds of iron sulphate to fifty gallons of water. When plants are matured use from one hundred to one hundred and fifty pounds of iron sulphate to fifty gallons of water. For such weeds as Canada Thistle, Stinkweed, Couch-grass, etc., use fifteen pounds of copper sulphate to fifty gallons of water, or sodium arsenite may be used at the rate of two pounds to fifty gallons of water. In using the latter, care should be taken, as it is extremely poisonous. It should not be used where live stock are liable to get in contact with the grass or crop treated. It has also been found, where sodium arsenite has been used, the crop was somewhat blighted, but it did not materially affect the yield.



TYPE OP SPRAYER WHICH WILL TREAT MANY ACRES IN A DAY.

The above cut shows the type of machine used by the Department in its experiments. A machine of this size sprays many acres in one day, and, although it may be too expensive for a single farmer, it will prove a good investment for a farmers' club, as it will easily do the work on eight or ten farms.

IDENTIFICATION OF WEEDS.

The Seed Branch of the Department of Agriculture, Edmonton, and the Schools of Agriculture at Claresholm, Olds and Vermilion, will identify free of charge any weeds sent to them. Weeds sent for identification should have both the flower and root, the plant should be wrapped in a damp cloth, then in strong paper, and forwarded by mail. The district in which the plant is found, and if possible, the nature of the soil, should be given.

MUSTARD FAMILY

(Cruciferae).

TUMBLING MUSTARD

(Sisymbrium altissimum L.)

Annual and winter annual of European origin introduced into the Prairie Provinces from the Western States. It appears first as a rosette of soft, pale green, downy leaves, resembling those of the Common Dandelion, and is very often mistaken for Shepherd's Purse. The mature plant is from two to four feet in height, stem branching, the upper leaves being much finer than those at the base of the plant.

The flowers are whitish or pale yellow in color, and average about one-third of an inch in diameter. They are succeeded by long, slender pods, each of which contains from fifty to one hundred and twenty-five seeds; a full-grown plant producing over a million seeds.

The plant branches very profusely, the branches growing out from the main stem in such a manner as to form a spherical-shaped head. At maturity it changes from a pale green to a golden yellow color, the stems become very brittle, breaking off at the base, and allowing the plant to blow over the prairie, scattering its seed far and wide.

Tumbling Mustard spreads very rapidly, due to its tumbling habit, from which its name is derived. It is a very rapid and vigorous grower, and if at all plentiful will soon choke out a grain crop. In cases where it is not so well established it often makes the cutting of the crop by self-binders impossible, as the head of the plant is so bushy and stiff that the machine will not elevate and deliver to the knotter. Fall wheat should not be grown where this plant is prevalent, because this weed will grow in the fall, forming a rosette of leaves and remain in that stage suffering very little during the winter. In the spring the plant will be so deeply rooted that the harrow will have no effect on it. It usually starts its growth before the wheat does, with the result that if the weeds are at all thick the wheat will be completely choked out.

This weed should never be allowed to mature. If it is, some farmer with clean land is bound to suffer. Individual plants have been known to travel one hundred and fifty miles and still contain seed. This shows that the seed is not easily shed from the pods,

Fig. 1
TUMBLING MUSTARD
(*Sisymbrium altissimum* L.)

and that every time the plant comes in contact with the ground it leaves some of its seed.

Time of Flowering: June to August. Seed ripe last of July to September.

The Seed: (Plate 1, Fig. 10) is small, one twenty-fourth of an inch long; one pound containing about six million seeds. The seed is a greenish yellow to olive brown in color, and somewhat "U" shaped.

Occurrence: In grain fields, roadsides, railroad grades, fire-guards and earthworks in the southern part of the Province.

Eradication: Where land is only slightly infested, harrow when the grain is up a few inches, as the mustard is then weak and tender, and will be easily pulled out by the teeth of the harrow. Follow this by hand-pulling at the time the mustard is coming into flower. Land that is badly infested should be summer-fallowed with as late cultivation in the fall as possible. Then in the spring seed thickly to some spring crop, harrow and hand-pull as already mentioned.

Never allow the plants to get so large that the harrow will not completely destroy them. Cultivation in the fall immediately after the crop is harvested is strongly recommended. Burn all screenings both from fanning-mill and thresher, also burn straw if badly infested, so that stock cannot eat it and distribute the seeds about the farm. Be careful of the feed of the working-horse. This mustard seed is objectionable to farm stock, with the exception of sheep, therefore no benefit is derived from feeding it.

Give attention to all old stack bottoms, edges of fields, road-sides, etc. Pasturing land badly infested with this weed with sheep, especially when the plant is young, has been found to be a sure remedy.

HARE'S EAR MUSTARD

(*Conringia orientalis* L.)

Annual and winter annual of European origin. An erect growing plant from one to three feet high. Whole plant smooth and when young covered with a bloom like that of a cabbage. Leaves somewhat fleshy, oblong oval, entire, and clasping the stem by two rounded lobes. They resemble in shape a hare's or rabbit's ear, hence the common name—Hare's Ear Mustard. Flowers are a creamy white, about a quarter of an inch across. Seed pods are four-sided, and from three to six inches in length.

Time of Flowering: June and July. Seed ripens August and September.

The Seed: (Plate 2, Fig. 14) a dark brown in color, one-twelfth of an inch long, granular roughened; in shape it resembles the seed of the Common False Flax.

Occurrence: Quite general throughout the Province, especially in fall wheat growing areas, and in the Foothill districts.

Eradication: Hand-pull small patches when they are first noticed. Harrow the grain when two inches high so as to destroy the seedling weeds. In fields that are badly infested, summer-fallow. In case a summer-fallow is not desired, a crop rotation as follows will keep it in check:

Cultivate immediately after the crop is harvested. Plough early the following spring, and work surface, then allow to stand until about June 1st. By this time all the weed seeds will have

Fig. 2

germinated. Cultivate well with a duck-foot cultivator, seed thickly to barley. After barley is harvested cultivate again, follow by ploughing late that fall or early in spring, when it can be seeded to either oats or wheat. Do not sow too thickly, and seed to timothy. It should be left in this crop for two or three years.

In its early stages this plant makes a very succulent food for sheep, and will be relished by them almost as much as rape.

WILD MUSTARD

(Brassica sinapistrum, Boiss L.)

Annual of European origin. Fibrous root and erect habit of growth, usually from one to three feet high. The stem is rough with stiff hairs somewhat scattered over the surface. The branches arise from the upper part of the stem and bear oblong leaves, and the lower leaves have one terminal large lobe and several smaller lyre-shaped lateral ones. The flowers are yellow, showy, and about two-thirds of an inch across. Seed pods are from one to two inches in length, and generally appear on the lower part of the stem whilst the top is still in flower. They appear knotted, and have a long empty tip. Each pod contains from twelve to twenty seeds, a strong plant producing ten thousand seeds.

Wild Mustard is considered a very harmful weed, owing to the amount of moisture it takes from the soil, thus robbing the crop of grain. The seed has also great vitality; in some cases it has been known to lie in the ground fifteen years, and grow when brought into favorable conditions for germination.

Time of Flowering: June to September. Seed ripe July and September.

The Seed: (Plate 2, Fig. 16) is of a reddish-black color, small and round, very similar to that of rape or turnip.

Occurrence: General throughout the Province, especially in the northern districts.

Eradication: Owing to the great vitality of this seed this mustard is very hard to eradicate. The seed, once in the ground, retains its power of germination for years, ready to grow as it is brought near the surface. The first precaution to be taken is to sow clean seed and feed clean grain to the farm stock, especially to working-horses. Hand-pull any stray plants or small patches. Be sure to gather and burn what is pulled. If this weed is very thick in one or two large patches on the farm, plant these places to potatoes, or seed to rape and pasture the crop off with sheep. When fields are overrun with the weed, either of the following methods of eradication is recommended:—

(a) After the crop is harvested, cultivate well with a disc or spring-tooth cultivator, or plough shallow and work down to a fairly fine surface. This will allow the seed to germinate if there is any moisture at all in the soil. Once germinated the plants will be killed by the fall frosts. In the spring cultivate as early as possible. Let more seed germinate and grow until about June 1st, then plough deep and seed to barley or oats, barley preferred, as the broad leaf of the barley is more effective in smothering the

Fig. 3
WILD MUSTARD
(*Brassica Sinapistrum Boiss* L.)

mustard out. After the barley is harvested, cultivate immediately, and follow the same procedure the next year. In cases where this method has been carefully followed and there still remains a great deal of mustard, cut the barley for green feed. In this way no plants are allowed to ripen, hence no new seeds are left in the ground.

(b) Cultivate after the crop is harvested, then summer-fallow thoroughly the following year. The spring following, work well and sow oats reasonably thick and as early as possible. After the crop is up about two inches high, harrow once or twice and then seed to timothy, if possible just before a shower and just before harrowing. Seeding with oats is preferable to seeding with barley, as it allows more air for the young timothy.

In some districts harrowing grain after it is up has been found to retard the growth of the grain to such an extent that it is frosted before maturity. This takes place only occasionally, but should be preferred to a weedy crop and farm.

Sheep assist very considerably along with both the above systems of eradication, if pastured on the field under cultivation, as they eat the young plants readily as well as pack the soil.

Spraying with chemicals has been proved to be a very effective way of destroying this weed. (See page 28.)

GREEN TANSY MUSTARD

(Sisymbrium incisum, Engelm).

Native, biennial, the first year growing a rosette of finely-notched leaves lying on the ground; second year growing erect from one to three feet high, considerably branched. Leaves bright green, much divided into fine segments. Flowers yellow, one-eighth of an inch across, borne in elongated clusters (racemes), and succeeded by narrow, smooth, slightly curved pods from one-half to three-quarters of an inch long, on slender spreading stems.

This mustard has a rank growth, and robs the soil of moisture needed to grow the crop. Its bulky nature often makes harvesting difficult.

Time of Flowering: June and July. Seed ripe August.

The Seed: (Plate 1, Fig. 11) is dark brown, about one twenty-fifth of an inch long, and somewhat oblong in shape.

Occurrence: General throughout the Province, especially in districts where fall wheat is grown.

Eradication: Do not sow fall wheat, or stubble in seed on ground infested with this weed. Owing to its biennial habits of growth a spring-tooth duck-foot cultivator should be used for surface cultivation, as a disc often passes over this weed without injuring it. Summer-fallow if conditions are bad. Care should be taken to destroy any rosettes which have started late in the fall and that will live through the winter. A two-year crop rotation followed by a pasture crop is strongly recommended where summer-fallow is not desired.

Keep all the edges of fields clear. Hand-pull strong plants, and be careful of your seed. Sheep will greatly assist in the eradication of this weed.

Fig. 4
GREEN TANSY MUSTARD
(Sisymbrium incisum Engelm)

GREY TANSY MUSTARD.

This mustard resembles the Green Tansy Mustard very much, excepting that the color is a darker green, and the plant is covered with short, gray downy hairs, and it is rather more erect in habit of growth. As this plant is similar to that of the Green Tansy Mustard, the same method of eradication will be found satisfactory.

BALL MUSTARD

(*Neslia paniculata* L.)

A weed of European origin. Annual and sometimes winter annual. Grows from one to four feet high, erect slender stems, strong plants producing one or more branches. Leaves oblong, the lower ones lance-shaped and pointed at the base, while the upper leaves are arrow-shaped, clasping the stem with two sharp, projecting points. The whole plant has a light green color, and is covered with fine hairs. Flowers small, orange yellow in color, in long, slender terminal clusters (racemes). The seed pods are round, borne on the end of short, slender stems. They are greenish-yellow when matured, and do not shed their seed readily, hence are often mistaken for the seed. Each pod contains only one seed which is of a pale yellow color. Owing to the size of seed and pod, it is rather difficult to clean out of grain by threshing machines or fanning-mills unless extra care and large screens are used.

This weed is very common in some districts. In some places it is practically crowding out the grain. It also is causing a great loss to many farmers through dockage.

Time of Flowering: June to August. Seed ripe July to September.

The Seed: (Plate 2, Fig. 15) is pale yellow in color, round, and about one-twelfth of an inch in diameter.

Occurrence: In grain fields, railroads and earthworks in Central and Northern Alberta.

Eradication: One of the most effective ways of eradicating this weed is to sow clean seed, and to take care that all feed grain is clean or finely crushed. If using manure on land make certain it is well rotted. Continuous grain growing should not be practised on land badly infested with this weed. Some system of crop rotation such as green feed, followed by timothy and pasture should be adopted.

Summer-fallowing will give good results if it is otherwise desirable, if not, the following method of cultivation is recommended:

Fig. 5
BALL MUSTARD
(Neslia paniculata L.)

Cultivate land immediately after harvest. Plough either late that fall or early the following spring. Work down each day what is ploughed. If there is time allow the weeds to germinate, then cultivate and seed thickly to grain. Harrow once or twice after the grain is up two or three inches in height.

As with other mustards, sheep will feed readily on the young plants.

WORMSEED MUSTARD

(*Erysimum cheiranthoides* L.)

Wormseed or Treacle Mustard is a native annual and winter annual. It grows erect with branching stems from eight inches to two feet high. The foliage is bright green and abundant. The leaves are long, tapering at the base into short patioles, and the whole plant is covered with T-shaped hairs. The flowers are yellow, and about a quarter of an inch across; the little stalks (pedicels) holding the pods come out from the stem obliquely, but the pod stands erect on the pedicel, parallel with the stem. The pod is about an inch in length, and contains from twenty to thirty seeds. A full grown plant produces twenty thousand seeds. The seed if present in any quantity gives feed a bitter taste, and with the exception of sheep it is not relished by farm stock.

The seed of Wormseed Mustard is often mistaken for that of Small Wallflower.

Time of Flowering: June and July. Seed ripens July and August.

The Seed: (Plate 1, Fig. 12) is of a reddish-yellow color, small, about one-sixteenth of an inch in diameter. Uneven in size and shows a furrow on one side.

Occurrence: Quite common in Southern Alberta. Often found growing on the raw prairie and waste places, but usually in poorly cultivated fields.

Eradication: Hand-pull and burn when in small patches. In cases where it is established throughout the field, cultivate well after harvest and plough late the same season or early the following spring. Be careful to give plenty of time between ploughing and seeding for the weed seeds to germinate. After the crop is up a couple of inches harrow once or twice, then hand-pull and burn

Fig. 6
WORMSEED MUSTARD
(*Erysimum cheiranthoides* L.)

when the plant is in flower. If this practice is not found effective, summer-fallow and seed to fodder crop.

This weed is not considered hard to control, therefore any kind of thorough cultivation should practically eradicate it.

Look after your seed, feed, stack bottoms, and road and fence allowances.

STINKWEED

(*Thlaspi arvense* L.)

Other English names: Penny-cress or French-weed.

In Montana it is called Fan-weed.

Annual and winter annual of European origin, introduced from Manitoba and Eastern Canada. The plant varies in height from six inches to two feet, the usual height being generally about eighteen inches. It grows as an erect plant, with a number of branches from the upper part. The plant when young is of dark green color, changing to white or golden color when matured. Lower leaves borne on footstalks, stem leaves spear-shaped clasping the stem at the base. The flowers are white and small with spreading flower stocks; the pods which succeed the flower are very characteristic. They are nearly orbicular, about half an inch across, quite flat, with a thin marginal wing extending all around, and notched at the top. Note this peculiarity in Fig. 7. Each pod usually contains about fourteen seeds, the plant produces from sixteen hundred to fifteen thousand seeds.

Stinkweed is a very persistent and vigorous grower, and is the cause of much discussion among leading agriculturists. Some farmers claim they can grow just as good crops on land that is infested with this weed as on clean land. This is impossible, because from any reasonable point of view, two good crops cannot be grown on a piece of land at the same time. Furthermore, from the amount of moisture and plant food taken from the soil by this weed, it must have an unfavorable effect on any cultivated crop. No doubt where Stinkweed is just beginning to establish itself evenly over the land, a fairly good crop may be grown in favorable years, but it is only a matter of a few years until this weed will take possession of the land, and the crop yield will be reduced to a very low point, perhaps practically nothing.

The writer has visited districts both in Canada and the United States where the farmers have abandoned their land owing to the ravages of this weed. Other districts have been visited where the average yields of grain have been reduced from thirty to ten bushels per acre. It may be stated that this weed generally takes possession

Fig. 7
STINKWEED
(*Thlaspi arvense* L.)

of the best soil on the farm, evidently preferring good black loam.

With the above facts in view no farmer can afford to neglect this plant, and should endeavor to eradicate the pest as soon as it makes its appearance on his farm. Fall wheat should never be grown on land that is infested with this weed to any degree, as conditions that are favorable for fall wheat are just as favorable for Stinkweed.

Time of Flowering: April to September. Seed ripe last of May to October.

The Seed: (Plate 1, Fig. 8) is reddish-brown in color, is flat and unsymmetrically oval. The flat surface has five or six loop-like lines running around the seed, terminating at the basal notch.

Occurrence: In the southern and western portions of the Province, especially in areas where the growing of fall wheat has been carried on, also common along railways and trails, and around feeding corrals.

Eradication: Owing to this plant living over winter in the rosette stage, growing in the spring as early as the snow disappears, and producing its seed by the last of May or first of June, it has been found necessary to mention more than one method of eradication. It is recommended that as soon as the weed is noticed on the land, the owner endeavor to acquaint himself with the habits of the plant. This will greatly assist him as to the best method of eradication to adopt.

In cases where the weed is only growing by stray plants over the farm, hand-pulling, gathering, and burning is most effective, and the most sure way of keeping it in check. Where it is found in small patches as the case generally is, some hoe crop should be grown, such as corn, turnips or potatoes. This means the continuous cultivation of the soil, besides producing reasonable returns from the work.

On land that is so badly infested that hand-pulling is impossible, one of the following methods of cultivation may be employed:—

(a) Cultivate immediately after the binder, so that the surface seed may germinate. In wet seasons it may be necessary to cultivate again before the winter sets in. The following spring plough shallow and work down each day that which is ploughed. Let this

stand until more seeds germinate, then cultivate well and seed thickly to oats or barley. Harrow the grain when two inches high, from one to three times at intervals. This will destroy the young weeds and also reduce the grain crop to a proper stand. Barley in this instance is much preferred, as the broad leaf of the barley has greater effect in smothering than oats have. If there is still considerable Stinkweed in the crop, it can be cut early for green feed. This system of cultivation can be carried out for three years, except that the land should be seeded to oats the second year, and to spring wheat the third. When seeding the wheat sow reasonably thin and seed down to Timothy, Brome or Western Rye Grass. Leave in hay or pasture for a period of years.

(b) Start cultivation early as above mentioned, but plough shallow late in the fall if possible and work down. The following spring after weeds are well started, plough slightly deeper than at the previous ploughing, work down to a fine surface, allow it to remain until more weeds germinate, then plough again, still deeper, bringing up more seeds to be germinated and destroyed by surface cultivation. This work should be completed by the latter part of July, when the land should be seeded to fall rye, which can be pastured that fall and during the following spring and summer.

(c) Summer-fallow for one year; this should consist of at least two ploughings, three will give better results.

Following this year's summer-fallow it should be worked late the next spring, then seeded reasonably thin to oats, harrowed when the grain is up two inches, and then seeded to Timothy, Brome or Western Rye Grass. Cut this crop for green feed if there are any matured Stinkweeds.

The above methods of eradication may appear to suggest a great deal of labor and expense, but unless one is prepared to undertake such, it cannot be hoped to eradicate this pest.

The seed of this weed will lie in the ground for twenty years, and will grow when it comes to within one inch and a half of the surface. Again investigations show that land badly infested with this weed will contain from ten to twenty seeds per pound of soil. This being the case, the necessity to plough often cannot be overlooked. Plough shallow at first, and then keep getting an inch or so deeper each time. This will eventually bring all seeds to the

surface where they will germinate and can be destroyed by surface cultivation.

In cases where the entire farm is infested, it is recommended that a large portion of the farm be seeded to Timothy or other hay crop, so that the remainder of the farm may be thoroughly cultivated. In seeding down to hay crop land that is infested with this weed, the owner should cut the hay two or three times the first year, after that the grass will control the weed fairly well.

Sheep, although not fond of Stinkweed, will eat many of the young plants.

Be careful of your seed grain and the feed of working horses.

SHEPHERD'S PURSE

(*Capsella Bursa-pastoris* L.)

Annual and winter annual of European origin, with a long, deep tap root. The root leaves form a large rosette which lies close to the ground, and in this stage lives through the winter. Following this it may only produce a single stock from one to six inches high, then producing its seed, or it may send up several branches from one to three feet high. The stem leaves are somewhat arrow-shaped. Flowers are very small and white in color. The seed-pod is quite conspicuous, and is invariably uniform in shape which is flat, triangular, and with a fairly deep notch in the top. Each pod usually contains about twenty seeds, an average plant producing over fifty thousand seeds.

When this plant is in the rosette stage it is often mistaken for Tumbling Mustard or Common Dandelion, yet on careful inspection and study it will be noticed that there is quite a difference in the leaves. The color of the Shepherd's Purse is inclined to be of a light gray while the Tumbling Mustard and Common Dandelion have leaves of a light green color.

Shepherd's Purse propagates by seed, and although not given very much attention in the Prairie Provinces it becomes rather a troublesome and costly weed to many tillers of the soil, is of a succulent nature and robs the soil of much fertility and moisture. It will often choke out new seedings to Timothy and other grasses or clovers and reduces the subsequent hay crops. It is also responsible for harboring over winter many fungus diseases.

Time of Flowering: Throughout the growing season. Seed ripens likewise.

The Seed: (Plate 1, Fig. 9) is small, one twenty-fourth of an inch long, oblong, light brown in color.

Occurrence: Throughout Alberta in all kinds of soil, common in gardens and around buildings.

Eradication: Around plots, gardens, waste places, etc., use the mower and scythe frequently. This will keep it from seeding and eventually it will disappear. In cases where the grain fields

Fig. 8
SHEPHERD'S PURSE

are badly infested, a thorough good summer-fallow will give the best results. Cultivating the land with a wide-shear cultivator late during the fall will give good results as many of the plants that would live over winter will be destroyed.

Such cultivation as recommended for the eradication of Tumbling Mustard will give good results in the eradication of Shepherd's Purse.

Sow clean seed.

YELLOW WHITLOW GRASS

(*Draba nemorosa* L.).

Native, annual and winter annual, growing from six to twelve inches high. The whole plant is slightly downy, branching below and bearing leaves to the elongated raceme. Leaves stockless, lance-shaped, slightly toothed. Flowers are of a whitish-yellow color. Pods elliptical—oblong, half the length of the footstocks which are almost horizontal at maturity.

There are many species of this weed, but none are considered very troublesome.

Time of Flowering: June and July. Seed ripens July and August.

The Seed: Is small, one-sixteenth of an inch long, egg-shaped, flattened, reddish-brown in color.

Occurrence: In stubble fields more or less throughout the Province.

Eradication: Thorough cultivation in the spring before seeding. Plough the summer-fallow early so that the plant will be destroyed before going to seed. In bad cases keep sheep on the summer-fallow and waste lands.

Fig. 9.

YELLOW WHITLOW GRASS.

(*Draba nemorosa* L.)

WILD RADISH

(*Raphanus Raphanistrum* L.)

Introduced from Europe. Annual and winter annual growing from one to three feet high. In general appearance it is like the Wild Mustard, but its yellow flowers have purplish veins on the petals. The flowers are fewer and larger, and also slightly paler than those of the Wild Mustard. The seed pods have no valves, but are composed of two joints; the lower is small, seedless, and remains attached to the footstocks. The upper one contains several one-seed cells. The branches are few, starting near the base of the plant, leaves are deeply lobed and of a pale green color. Both the leaves and stocks are covered with short, stiff bristles.

Wild Radish, if it becomes well established on the farm, is practically as troublesome and as hard to eradicate as Wild Mustard. The habits of propagation and growth are similar.

Time of Flowering: July to September; seed ripe August to last of September.

The Seed: Is about one-tenth of an inch long, varies much in size and shape, is usually oval, slightly flattened, and in color is a light reddish-brown.

Occurrence: Only in a few places in Alberta—generally introduced with flax-seed.

Eradication: This plant is like the Wild Mustard and may easily be hand-pulled. Often a field which appears to have a complete crop of this weed can be cleaned at a profitable rate by hand-pulling, as the branching habit with the attractive color of the flower is very deceiving, therefore the weeds look to be a great deal more numerous than they really are. Summer-fallowing is the surest method of cultivation to reduce this weed when hand-pulling is not possible. It will be necessary to plough the summer-fallow at least twice, and follow each ploughing with a thorough cultivation at short intervals.

Crop rotation of from three to five years' duration will prove probably just as effective in most cases and perhaps more profitable.

The following is given as a suggestion:—

Cultivate in the fall, the coming spring work well and late until the soil is sufficiently warm to produce a vigorous growth, then seed thickly to barley, harrow a couple of times after crop is up, and cut for green feed. The next year seed to oats with timothy, pasture the timothy for at least two years. If the timothy is cut for hay, cut it early before any plants mature their seed. Sheep feed readily on the young plants of this weed, and will often keep it from producing seed.

The seed of this weed has been introduced into the Province in nearly every instance with flax seed, therefore it is necessary that flax or any other seed be cleaned before seeding. Spraying this weed with chemicals has proven very successful (see article on page 28)

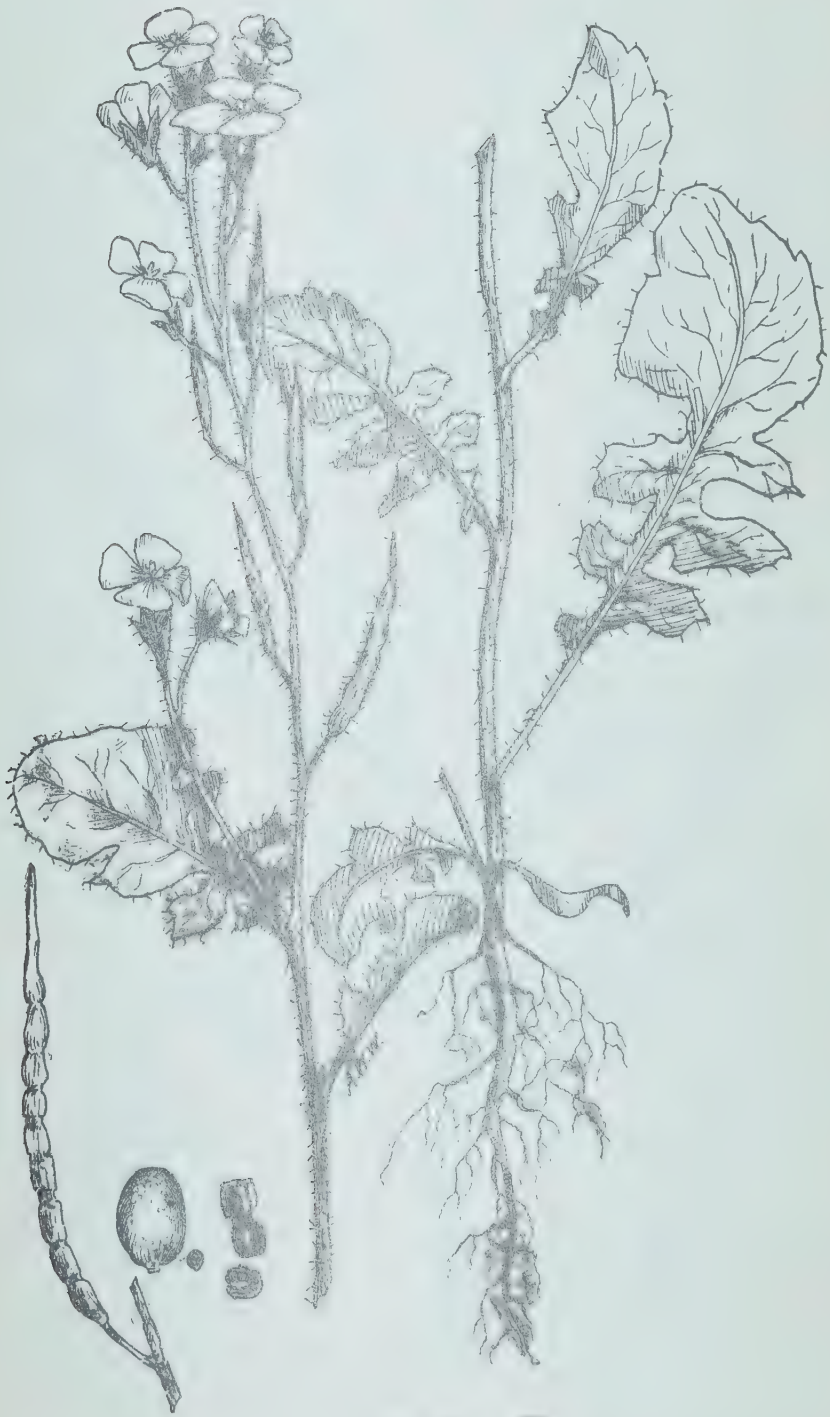


Fig. 10.

WILD RADISH.

(*Raphanus Raphanistrum* L.)

WILD PEPPER GRASS

(*Lepidium apetalum, Willd*)

A native annual and winter annual, grows from six inches to two feet high. The stem usually has many branches, and the lower leaves terminate in a large lobe with small lateral ones, and with edges lightly cut in along the margin. The upper leaves are tapering. The whole plant is greyish in color and is covered with short hairs. Plants which start in the fall first appear as a rosette of dark green leaves. As the plant matures these leaves drop off. The flowers are small and white, with slender spreading flower stocks. Seed pods small, about one-tenth of an inch wide, heart-shaped, slightly longer than wide, notched at the top, and at maturity separate into halves.

This plant has not become very troublesome in Alberta as yet, but is steadily increasing, and will have a bad effect as an impurity upon the sale of timothy and clover grown for seed.

Time of Flowering: June and July. Seed ripe early part of July and during August.

The Seed: Is of a reddish-yellow color, about one-sixteenth of an inch in length. Each pod contains two seeds, and an average plant produces eighteen thousand seeds.

Occurrence: Generally throughout the Province in waste places, gardens and cultivated fields, generally in sandy soil.

Eradication: This plant is somewhat like the Stinkweed in that if the seed is ploughed under after it is matured it will germinate when brought to the surface again. Care should be taken to either burn or cut and burn this weed before ploughing the land. To work the land for spring crop it should be cultivated thoroughly and late into spring with a duck-foot cultivator, then seeded thickly to barley. Harrow when the grain is one or two inches high. After harvest work the land, and then cultivate well before winter sets in. This will destroy any plant which would have otherwise lived over until spring.

Summer-fallow in bad cases.

Fig. 11.

WILD PEPPER GRASS.

(*Lepidium apetalum, Willd.*)

FALSE FLAX

(*Camelina sativa* L.)

Often called Balloon Mustard.

Introduced from Europe, annual and sometimes winter annual. It grows erect from two to three feet high, branching almost entirely from the upper portion of the stem. Foot leaves lance-shaped, and upper leaves quite sharply arrow-shaped, both upper and lower leaves clasping the stem. The lower leaves and the lower part of the stalk downy, while the upper part of the stem is quite smooth. The flowers are numerous, small, and borne in loose clusters. They are rather inconspicuous, being yellowish-green color. The pod is pear-shaped or globular, with a small projection from the upper end, each borne on a slender footstalk, curved upward and containing about ten seeds.

The seed of False Flax is very oily, and is grown in Europe for its oil which is manufactured into a stock food. The seed when ground with common cereals gives the meal an objectionable flavor.

This weed is increasing at a rapid rate in Alberta, and careful attention should be given it.

Time of Flowering: June to August. Seed ripe July to September.

The Seed: (Plate 2, Fig. 13) is about one-twelfth of an inch long, pale yellowish-brown in color, somewhat resembling a miniature wheat seed.

Occurrence: Quite common throughout the Province, especially in districts where fall wheat and flax are grown.

Eradication: Hand-pull when practicable. For spring grain plough if possible in the spring just before seeding. This should not be undertaken until good warm weather is assured. After the crop is up a couple of inches it should be harrowed, which will kill many of the seedlings. Land infested with this weed should always be cultivated after harvest, and at intervals until winter sets in. Flax or fall wheat should not be sown on land infested with this weed.

Try a good three-year crop rotation.

Sow clean seed.

Fig. 12
FALSE FLAX

SMALL WALLFLOWER (*Erysimum parviflorum Nutt*)

Native biennial growing from six inches to two feet high; stems erect, simple or branching, whole plant hoary with short, stiff bristles. In color it resembles the prairie sage. Flowers are bright yellow, and about one-quarter of an inch across. The seed pods are borne on short stems, and are somewhat similar to those of Wormseed Mustard, perhaps slightly coarser and longer.

This weed is often mistaken for Wormseed Mustard. It is not considered dangerous, as any kind of good cultivation will soon exterminate it.

Time of Flowering: July-August. Seed ripe August to September.

The Seed: Irregular in shape, and reddish-brown in color.

Eradication: Thorough cultivation before seeding. Spring ploughing is recommended. Siummer-fallow in bad cases. Hand-pull scattering plants. See method of eradication for Wormseed Mustard.

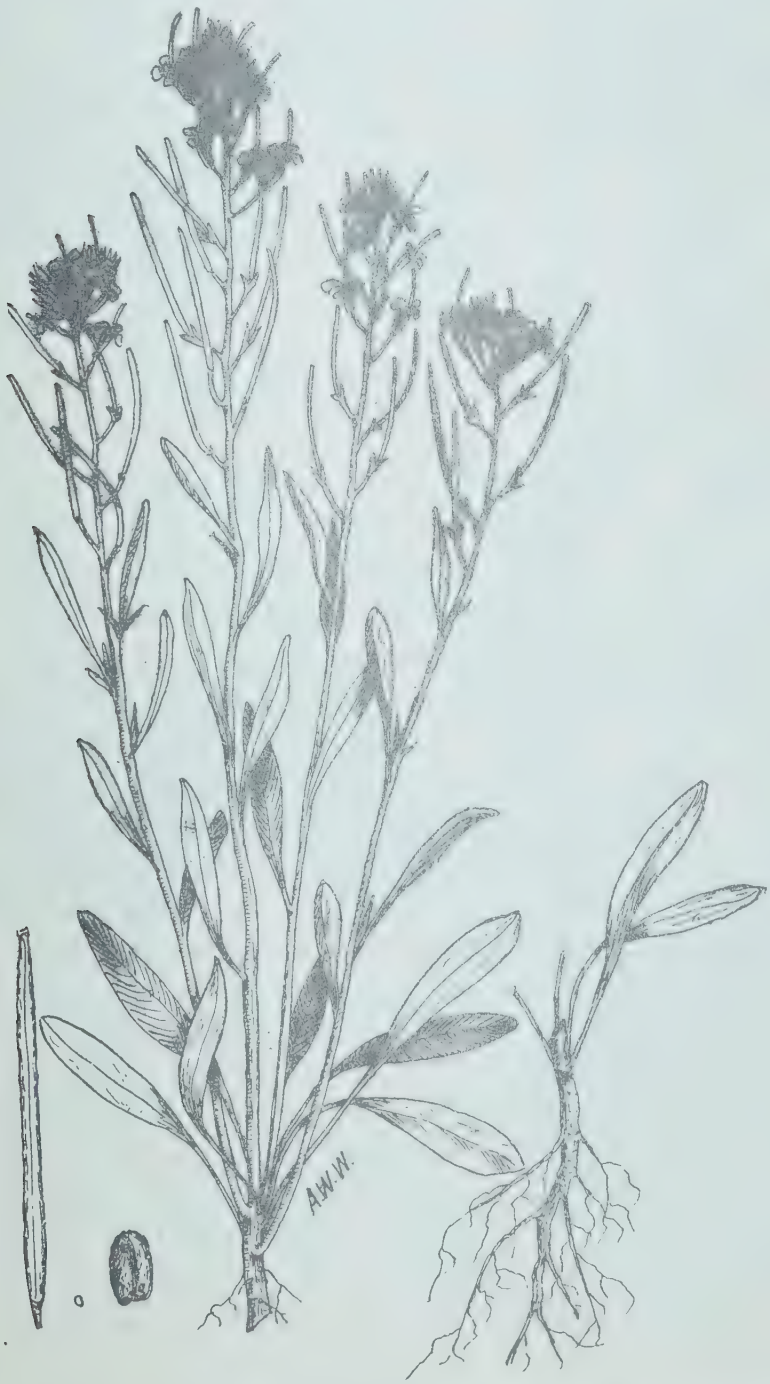


Fig. 13
SMALL WALLFLOWER (*Erysimum Parviflorum Nutt*)

SUNFLOWER FAMILY

(Compositae)

CANADA THISTLE

(Circium arvense L.)

Perennial of European origin. It is a hardy plant with numerous underground roots which bear a large number of shoots. It is an erect growing plant from two to four feet high. Leaves deeply notched and very prickly, with a somewhat crimped appearance. The under surface of the leaves is woolly, and greyish in color. The upper surface is smooth, and dark green in color. It produces many heads containing flowers, which are usually from about three-quarters to one inch across, and of a light purple color. The male plants produce no seed, while the female plants will bear as many as sixty heads, producing in the neighborhood of five thousand seeds.

The plant generally makes its first appearance in patches, indicating its habit of propagation by root. The seed is light, and owing to the tuft of silky hairs attached, which acts as a parachute, the seed is often carried many miles by the wind. It is a gross feeder and a vigorous grower, hence once well established it will soon affect the yield of grain.

Time of Flowering: June to September. Seed ripe July until growth ceases.

The Seed: (Plate 2, Fig. 20) is about one-eighth of an inch long, light brown, oblong, with slight longitudinal markings.

Occurrence: Quite common in the south-western part of the Province, occasional patches throughout the remainder.

Eradication: There are several methods of eradicating Canada Thistle, and the one best suited to the conditions prevailing must be adopted. Different soil conditions necessitate different methods of treatment. In some soils it is more persistent than in others. The system of farming followed, where the thistle occurs, also enters into the problem, that is, as to whether or not smother crops or cultivated crops, for instance, are to be used, or as to which ones can be used to advantage. In any case, the success of the method used is very largely dependent upon the intelligence, thoroughness and persistence with which it is carried out. The conditions should be well understood, and all the factors concerned taken into consideration, as far as possible. The underground rootstock of the weed is its food-storage organ and it must be killed outright or starved out by preventing growth of the leaves, which manufacture the food for the plant. The methods of eradication fall naturally into two classes according to the occurrence and abundance of the weed, whether in small scattered patches or abundant over large areas.

Fig. 14
CANADA THISTLE

In case of small patches one of the following three methods may be used, but must be thoroughly and persistently carried out:—

(1) Keep the thistles thoroughly cut with a hoe, every few days throughout the growing season. It may take two seasons to complete this work, but if properly done there will be little further trouble.

(2) Thoroughly grub out and remove all underground root-stocks with a spade or shovel. One or two operations is usually sufficient. Keep close watch for straggling plants at intervals and treat them in the same way.

(3) To smother by placing good, strong tar-paper over them. In using this method the paper should over-lap well, and be held down by stones, dry soil, or pieces of timber.

In cases where whole fields are infested, the above mentioned methods are impracticable. The eradication of this weed then means that its underground roots must either be grubbed out and gathered, or such surface cultivation employed as will result in the starvation of the roots. With this object in view the following two methods are given:—

(1) To plough shallow immediately after harvest. Work with the wide-shear cultivator at intervals until late in the fall, then plough deep, turning as many of the roots up as possible, which should be left in this state over winter, whereby they will be killed by the hard frosts. In the spring continue this cultivation with the same implement until June, then plough again deep, work well and seed thickly to barley. If this system of cultivation is carried out thoroughly for two years it will practically eliminate this pest.

(2) To cultivate early for summer-fallow with the wide-shear spring-tooth cultivator, and then plough shallow. Continue cultivation until July, when it should be ploughed deeply. At this time of the year the sun is hottest, therefore roots brought to the surface will be killed by the heat. It can then be either cultivated during the remainder of the season or prepared extra well and then seeded to either Rye or Winter Wheat, Rye being preferred.

In using the cultivator see that the teeth are always kept clean, and do not attempt to work the land when wet. This will only serve to distribute the pest by its underground rootstocks to greater areas, and in addition will be injurious to the physical condition of the soil itself. It is also well to work infested areas separately to avoid spreading the pest by distributing pieces of the rootstocks to clean parts of the field.

It cannot be hoped to keep this weed in check if stray plants are allowed to go to seed. These should be cut with a mower or scythe just previous to producing their seed, or when they first blossom.

This weed is kept in check in Ontario by a rotation of crops consisting of field roots, corn, clovers and grasses.

PERENNIAL SOW THISTLE

(*Sonchus arvensis* L.)

Other names: Field Sow Thistle, Creeping Sow Thistle, and incorrectly called Milkweed.

Perennial. Introduced from Europe. It is a tall, coarse-growing weed with numerous thick underground stems or root-stocks. Upon these, at intervals of a few inches, are borne buds which develop into new plants. Stems hollow, simple, and branching at the top. When broken it exudes a bitter, milky juice, which is responsible for this plant being incorrectly called Milkweed. The leaves are from six to twelve inches long, pointed, deeply cut with the segments pointed backwards, slightly prickly. The whole plant is of a deep green in color, and is covered with soft spines. Flowers are bright yellow in color, and from one to one inch and a half across, somewhat resembling the ordinary dandelion.

This weed is often confounded with such plants as the Mountain Dandelion, Wild Sunflower, Common or Annual Sow Thistle and Prickly Lettuce. The Department is often put to unnecessary expense in investigating reports that Perennial Sow Thistle has been seen in certain districts, and it turns out to be one of the other four weeds mentioned. This weed is found only in a few places as yet in the Province, and in very small patches. It is considered to be the worst to control known at the present day. Hence it is important that everyone, whether farmer or not, should be able to identify it and should know the habits of growth, propagation, etc., of this pernicious plant.

This weed the first year grows a small rosette of leaves, and not until the second year does it produce any flowers. It is generally found in small patches, and usually no matter how high the grain is, it grows to an equal height. This, with its very conspicuous flower, makes the plant very noticeable, and there cannot be any excuse for not seeing and locating it on the ordinary farm.

Time of Flowering: July to August. Seed ripe, August and first half of September.

The Seed: (Plate 2, Fig. 22) is a dark reddish-brown in color, about one-eighth of an inch long, somewhat spindle-shaped with blunt ends. Each seed bears at the top a tuft of soft, silky hairs which spread when dry and enable the seeds to be carried long distances by the winds.

Occurrence; Only in small patches in the Province.

Fig. 15

PERENNIAL SOW THISTLE

(*Sonchus arvensis* L.)

Eradication: As the habits of this weed are practically identical with those of the Canada Thistle, the method of eradication should also be the same, except that as the Perennial Sow Thistle is a much more vigorous grower, the method of eradication should be correspondingly thorough.

This weed has most of the bad qualities that a bad weed can have. It is a rank grower and so exhausts moisture and fertility, shuts out the sun and crowds the crops. It propagates both by seed and rootstocks. The rootstocks spread rapidly and are hard to get out, and the seed is easily distributed and is produced in abundance.

ANNUAL SOW THISTLE

(*Sonchus oleraceus* L.)

Common Sow Thistle, or Milk Thistle, is a rank-growing annual of European origin with fibrous roots. It differs in this respect from Perennial Sow Thistle, which has extensive creeping root-stocks. The stems are very slightly branching, growing from one to four feet high, covered with coarse hairs, leaves deeply notched, each leaf being terminated by a large lobe; base of leaves clasp the stem with two sharp points. Flowers pale yellow in color, one-half to one inch across, resembling very much the common lawn dandelion.

Time of Flowering: June to September. Seeds ripe July to September.

The Seed: Is about one-eighth of an inch long, dark reddish brown, is a little shorter than that of the Perennial Sow Thistle, and the ridges are farther apart. The whole seed is crossed with wrinkles.

Occurrence: Only in a few places throughout the Province, usually found in waste places and gardens.

Eradication: Hand-pull or cut close to the ground to prevent seeding.

SPINY-LEAVED OR PRICKLY SOW THISTLE

(*Sonchus asper* L.)

Annual, erect growing plant from one to three feet high. Leaves less deeply cut than in the Perennial or Common Sow Thistle, and fewer of them. Flowers pale yellow in color. The habits of growth, time of flowering, time and features, and methods of eradication are practically the same as those of the Common Sow Thistle.

Some points of distinction between the Perennial Sow Thistle and Annual Sow Thistle. :

(1) The Perennial Sow Thistle is taller, and a coarser growing plant.

(2) It has numerous underground rootstocks, while the annual species has fibrous roots.

(3) The leaves of the Common Annual Sow Thistle are deeply cut and lobed, and scarcely spiny. The leaves of the Spiny Annual Sow Thistle are almost entire, rather prickly. The leaves of the Perennial Sow Thistle are deeply cut, but not lobed, and slightly prickly.

(4) The flowers of the two annuals are pale yellow in color, and about one inch across, while the flowers of the Perennial are bright yellow in color, and considerably larger.

BLUE LETTUCE

(*Lactuca pulchella* D.C.)

Native. A deep-rooted perennial growing from two to three feet high. Whole plant smooth and covered with fine bloom, filled with milky juice. The lower leaves are deeply notched at the base, lance-shaped, terminating in a large, oval, pointed tooth. The upper leaves are long, lance-shaped and very slightly notched. The flowers are borne in panicles at the top of the plant, about one inch across, and pale blue in color.

This plant is increasing very rapidly in this Province, therefore should be given careful attention. Being a perennial it is hard to exterminate once well established. It is generally first found in patches, and as very little crop will grow with it, it is not hard to locate in a field.

Time of Flowering: June and July. Seed ripe in August.

The Seed: (Plate 2, Fig. 23) is about one-quarter of an inch long, including the short beak at the end of which is borne a tuft of white down. It is in color a light reddish-brown and is striped with dents which are darker in color.

Occurrence: General throughout the Province, but quite common in the south-western part.

Eradication: Prevent it from distributing its seed by cutting it when it is found round the edges of fields and waste places. When in grain fields in small patches dig it out and then hoe at intervals. In cases of whole fields being infested a thorough summer-fallow is recommended, followed by a good, thick crop of barley. The summer fallow should receive good, deep cultivation as this plant is deep rooted. Use the wide-shear cultivator as much as possible. Work the land late in the fall.

The same method of cultivation as advised for the eradication of Canada Thistle will give good results.

Spraying small patches may be effective.

See article on spraying, page 28.

Fig. 16
BLUE LETTUCE

PRICKLY LETTUCE

(*Lactuca Scariola* L.)

Annual and winter annual of European origin. Introduced into Western Canada from the United States. It is an erect growing plant from two to four feet high. Stems leafy and usually smooth. Leaves are oblong and slightly pointed, both the margin and the mid-rib beneath have spines. Flower heads numerous and pale yellow.

Time of Flowering: July and August. Seeds ripe August and September.

The Seed: Is about one-eighth of an inch long, dark greenish-grey in color. It may be distinguished as being similar to that of garden lettuce, only somewhat smaller.

Occurrence: Any good thorough cultivation should keep this weed in check. Seeding to grass crop for a period of three years is recommended. Keep all plants around waste places, etc., cut close to the ground. Sow clean seed.

GREAT RAGWEED

(*Ambrosia trifida* L.)

Often called Tall Ragweed, Crownweed, Kingweed, or Bitterweed.

A native annual. A tall, coarse, branching plant, four to six feet high; leaves pale green in color, apposite, mostly three lobed; both stems and leaves covered with short, stiff bristles; individual flowers inconspicuous; sterile and seed-producing flowers being borne on different parts of the same plant. The sterile flowers are borne on long spikes and the seed-bearing flowers are borne in clusters in the axils of the leaves at the base of the spikes. The sterile flowers are one-quarter of an inch across, cup-shaped and yellow, while the seed-bearing flowers are more of a purplish yellow.

Time of Flowering: July and August. Seed ripe August and September.

The Seed: (Plate 2, Fig. 18) is about one-quarter of an inch long, greenish-brown in color. The similarity in shape of this seed to a crown has suggested the name Crownweed or Kingweed, sometimes used in reference to this plant.

Occurrence: Not common in grain fields in this Province, mostly found along railways and around feeding camps.

Eradication: Owing to the size of the seed of this plant being nearly as large as wheat or barley and having a rough spiked surface it is very difficult to separate from many cereals. Thus it is important to sow clean seed. When hand-pulling is possible this weed should be got rid of in this way, as it will not only clear the land of weeds, but will also pay for the work by the extra yield of the crop in one year. It is one of the heaviest feeders of all the noxious weeds. In bad cases summer-fallow thoroughly. Keep the edges of the grain fields, pastures and plots cut with the mower.

Sheep and hogs will eat this weed, but cannot be expected to live on it and keep it in check.

Fig. 17
GREAT RAGWEED
(*Ambrosia trifida* L.)

Time of Flowering: June to August; seed ripe July to September.

The Seed: Is about one-eighth of an inch long, varying in color from a yellowish-brown to black with a mealy surface. There are usually about two seeds in each flower head.

Occurrence: In only a few districts in Southern and Central Alberta.

Eradication: If in small patches, plough deep and plant to potatoes, which should be cultivated and hoed once every week during the growing season. In cases of large areas summer-fallowing is the best remedy. This should be done by ploughing deep and cultivating at intervals with the broad-shear, duck-foot cultivator, and if possible when the ground is dry and the sun hottest. Do not use the disc to eradicate this weed.

COCKLE BUR

(*Xanthium strumarium* L.)

Native. A coarse-growing annual, from one to three feet high, considerably branched. Leaves are large, heart-shaped or ovate, and dark green in color. The flowers are borne on different parts of the plant and along branches in clusters. The male flowers are borne above, the female below. The burs are about one inch in length, and are thickly covered with strong spines which are curved at the ends. Each bur is separated into two cells which contain one seed. The seed of this weed retains its vitality for a number of years. The bur sticks to the hair of live stock, and is especially troublesome to sheep if the bur gets into the wool, as it irritates the skin and reduces the value of the wool.

Time of Flowering: July and August. Seed ripe August and September.

The Seed Pod: (Plate 2, Fig. 19) in appearance a bur from one-half to one inch long, surface leathery and covered more or less with prickles. Each bur contains two seeds.

Occurrence: In the southern part of the Province, along railways, rivers and in a few fields.

Eradication: Hand-pull if possible; this will prevent seeding. Keep all waste places and pastures cut with the mower. In cases of whole fields being infested summer-fallow thoroughly. In spring, grain harrow two or three times after the crop is up, and then cultivate immediately after harvest.

Sow clean seed.

Fig. 19
COCKLE BUR
(*Xanthium strumarium* L.)

point of view. In answer to the first the writer has no hesitation in stating that Wild Oats can be eradicated much more easily than such weeds as are classed as perennials. Wild Oats being an annual plant, its eradication then consists of such a method of cultivation as will germinate the seed, then destroy the growth before it produces its seed. With this in view the following two suggestions are given:

(1) To plough shallow or cultivate immediately after the infested crop is harvested. The purpose of this is to make a mulch to germinate the surface seed, which, if not frozen before going to seed, can be destroyed by cultivation. In the spring as soon as a good growth has started it should be ploughed again about four inches deep. This will bring a supply of seeds near the surface to germinate and to be destroyed as previously. Then about July 15th it should be ploughed deep as possible, worked well and seeded to Winter Rye, which can be pastured the same fall and following spring.

(2) Start cultivation as stated in (1) but plough deep reasonably early the following spring. Work this well until June then seed thickly to barley and oats. Cut for green feed. After green feed is harvested, cultivate or plough shallow. Leave in that state until spring, then work well until assured of good, warm growing weather, then seed reasonably thin to oats, also to Timothy. Cut oats for green feed, and leave the land in Timothy from two to five years.

If the whole farm is infested with this pest do not undertake to clean it all in one year. Take what it is considered can be well done, and make sure that the work is carried out systematically.

Grain that is grown on an infested farm should never be used for seed grain. Sell it and buy clean seed. The difference between what feed grain sells for, and the price of seed grain is not a large amount. Make sure that the manure has been well rotted before

Fig. 20

applying to the land. There is no use cleaning land of Wild Oats by cultivation if you allow other agencies to infest it again.

In working land infested with this weed, keep all the live stock possible pasturing on the area worked, as they will eat all the new growths, as well as pack the soil and so encourage germination.

Look after the screenings and the plants growing around the edges of fields, roadsides and waste places.

WILD BARLEY OR SKUNK-TAIL GRASS

(*Hordeum jubatum* L.)

Often called Squirrel-tail Grass, Tickle Grass, and inaccurately Foxtail.

Native perennial grass growing in tufts from six to fifteen inches high. Leaves are pale green in color, from three to five inches long with rough margins. Flowers are in a silky, bristly spike, from three to four inches long, pale yellowish-green in color. The whole plant somewhat resembles barley.

Before the heads are ripe the awns are tender but when they become ripe they are very stiff and cause considerable inconvenience to cattle, sheep and horses that eat them. The awns pierce the lips and also work down around the teeth causing inflammation. Reports have also been received stating that they have been known to work into the wool around the eyes of sheep, in some cases even penetrating the eye-ball, causing blindness. They are also very troublesome in hay.

Time of Flowering: July. Seed ripe July to August.

The Seed: Is slender, sharp-pointed, somewhat resembling a small barley seed, and has a long, upwardly barbed awn.

Occurrence: In every part of the Province, generally found in low, wet places which are more or less alkaline.

Eradication: There should be no difficulty in keeping land under cultivation clear of this weed. Any thorough system of cultivation and crop rotation will exterminate the plant in a short time. In cases where it is growing in hay meadows or pastures, it should be cut before seeding, raked up and burned. It may be necessary to do this twice during the season, but if done at the proper time once it will practically eradicate this pest.

Before breaking land infested with this weed it is advisable to burn it over the previous fall.

Fig. 21
WILD BARLEY OR SKUNK-TAIL GRASS
(*Hordeum jubatum* L.)

COUCH OR QUACK GRASS

(*Agropyron repens* L.)

Often called: Scutch, Twitch, Quitch Grass.

Perennial of European origin growing from one to three feet high. It has wide-spreading, but shallow, fleshy rootstocks, forming large matted beds. Leaves are dark green, quite distinctly ribbed. The flower is borne in three to seven flowered spikelets lying flat against the stalk.

This weed is not very prevalent in this Province as yet but is steadily making headway, due mostly to its not being distinguished from other grasses. It is an extremely hard plant to eradicate, especially if it gets well established in a loamy or humid soil.

Time of Flowering: June, July. Seed ripe July and August.

The Seed: Is about one-half inch in length, rather slender (see cut opposite page).

Occurrence: Only in a few places in Southern and Central Alberta.

Eradication: In bad cases, plough shallow immediately after harvest. Work at intervals with a spring-tooth cultivator until winter sets in, gather any roots brought to the surface, place them in heaps and burn when dry. The following spring continue this cultivation and gathering until June 20th, then seed thickly to barley or rape. In working land to eradicate this plant do not use a disc, as this implement often cuts the running, underground root-stocks into short lengths, each of which will produce a new growth. In using the spring-tooth cultivator endeavor to keep the teeth perfectly clear of rubbish. Try to eradicate this weed when the sun is hottest.

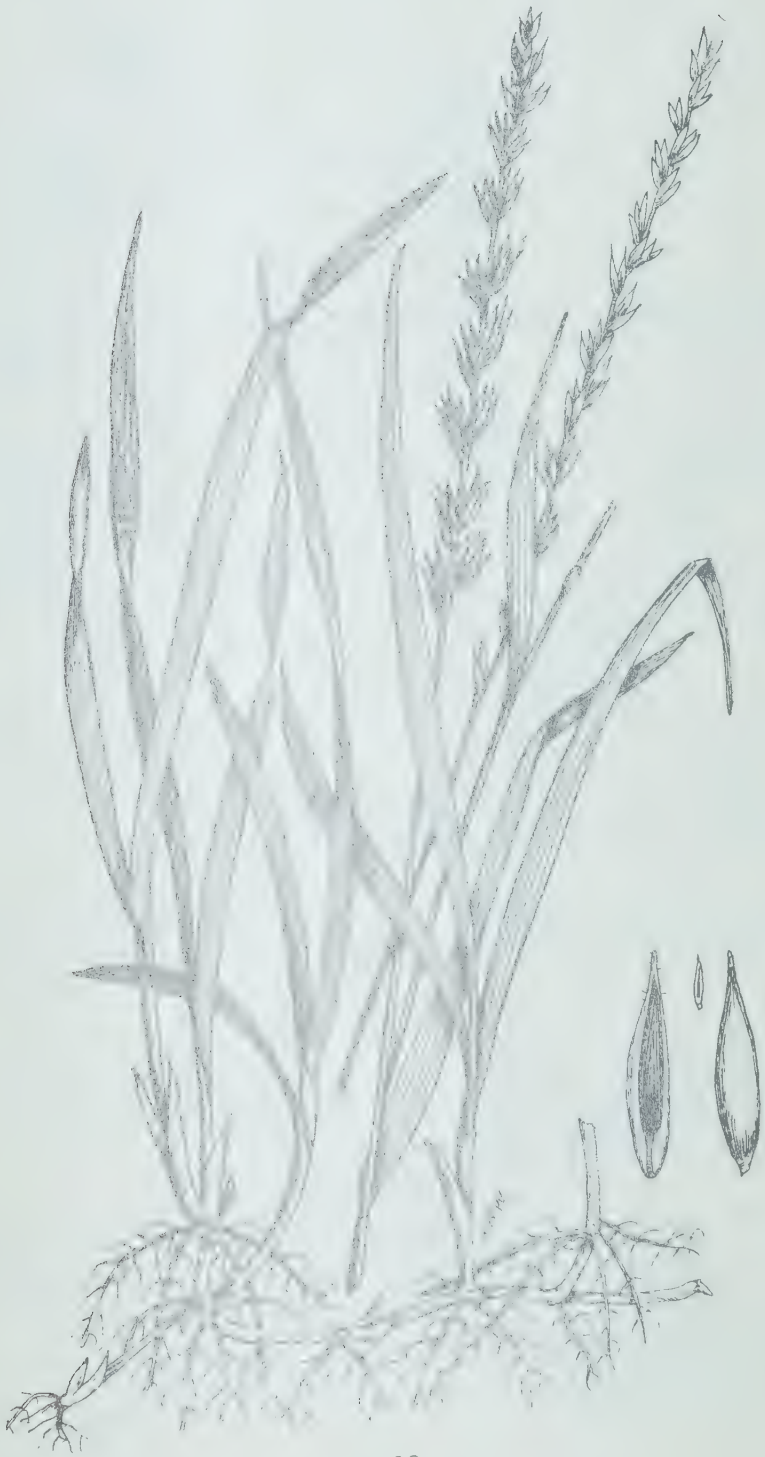


Fig. 22
COUCH OR QUACK GRASS
(*Agropyron repens* L.)

SWEET GRASS

(*Hierochlæ odorata* L.)

Other names: Indian Hay, Seneca Grass, very often incorrectly called Couch or Quack Grass.

Native: A deep-rooted perennial with wide-spreading rootstocks, which shoot up new plants every few inches. The whole plant is bright green in color, turning to a golden yellow when matured. Flower stems are thrown up early in the spring. The flowers are borne in loose panicles which contract, and are of a dark brownish color when ripe.

Time of Flowering: April and May. Seed ripe June and July. The seed is enclosed in the inner smooth scales. The naked seed closely resembles Timothy, and is often found as an impurity in Timothy seed. (See cut on opposite page.)

Occurrence: Common throughout the Province, especially in the middle and northern portions; prefers low, heavy, damp land.

Eradication: The creeping rootstocks in this case as in that of Couch Grass make it a difficult weed to combat. "Farm Weeds" recommends as follows:—

"Mow and burn while the grass is in bloom in May to destroy the seeds. Then plough deeply to get below the rootstocks which may be brought to the surface by thorough cultivation continued throughout the summer. This will be made more effective by deep ploughing as late in the fall as the frost will allow.

Fig. 23

SWEET GRASS

(*Hierochlæ odorata* L.)

GOOSEFOOT FAMILY

(*Chenopodioceae*)

RUSSIAN THISTLE

(*Salsola Kali* L.)

Other names: Russian Tumbleweed, Russian Cactus.

Annual, introduced from Asia. The leaves and branches of the young plant, when it is from two to four inches high, are very dark green in color, and thread-like in form, somewhat resembling a pine tree seedling. As the plant matures, it gradually assumes a spherical form, and the branches are covered with lines and splashes of red. When the plant is ripe it is of a reddish-yellow, and will break off easily at the base. The flowers are inconspicuous, being small, without petals, and solitary in the axils of the leaves.

When this plant is young it is very tender and succulent, and will be eaten readily by stock, but when matured it is very stiff and prickly, and often troublesome to the legs of horses when they are compelled to travel through it.

This weed, owing to its tumbling habits and its preference for a dry soil, is very prevalent in Southern Alberta. On account of its rank growth and the fact that it grows best in dry places it causes serious loss by using up moisture that is required for the development of the grain.

Time of Flowering: July to September. Seeds ripe August to September.

The Seed: (Plate 1, Fig. 3) is about one-sixteenth of an inch in diameter, conical in shape, and the outer coat is greyish and ragged in appearance. When this is removed the coiled germ is exposed.

Occurrence: General in the southern and south-eastern portion of the Province; usually abundant on abandoned farms.

Eradication: If there are only scattered plants hand-pulling is the surest method of eradicating this weed. Where the infestation with this weed is bad, summer-fallowing is strongly recommended, which, if thoroughly done, will probably clear the land of this pest in one season, as the life of its seed is not of more than two years' duration. The use of a wide-shear cultivator will give good results as this implement will generally destroy such plants as will be missed by the disc. In cases where spring grain is seeded on land

Fig. 24
RUSSIAN THISTLE
(*Salsola Kali* L.)

badly infested with this weed, the land should be worked well early in the spring, and at intervals until good warm weather is assured, then seeded reasonably thick. This will give the grain a quick growth, which will result in smothering the weed to some extent. After the grain is up two or three inches it should be harrowed, as the Russian Thistle is very tender in its early stages, hence is easily destroyed by the harrow.

Russian Thistle usually germinates after the grain crop is up, and often does not grow very much until the crop is cut, then it branches out and matures very rapidly. This being the case, a good plan to check this growth is to cultivate immediately after the binder, then plough as soon as possible after the crop is removed.

The growing of fall Rye is strongly recommended where this weed is prevalent, as the stock pasturing rye will eat this weed as readily as the rye, and furthermore, any unmatured plants that are likely to be left will be killed by the frosts. Farmers who are bothered with this weed should keep sheep.

Feed and seed clean grain.

LAMB'S QUARTERS

(*Chenopodium album* L.)

Other names: Pigweed, Fat-hen.

Annual. Native and European plant, varying greatly in its general characteristics. It grows from one to four feet high, with erect, slender stems which are grooved and branched. Leaves are pale green in color, coarsely toothed, narrow at the base, and borne on long, slender stocks. Flowers are greenish in color, and arranged in compound spikes, borne in the axils of the leaves, individual flowers inconspicuous. The whole plant is of a more or less mealy appearance.

This weed, although not classed as a noxious weed in Alberta, is one that should receive some attention. It is a gross feeder and is a very serious pest, especially in gardens and field root crops. It is also a harbor for insects and fungus diseases.

Time of Flowering: June to September. Seed ripe, August to November.

The Seed: Is about one-twentieth of an inch in diameter, round and flattened on one side, and is shiny-black in color. This seed is often found enveloped in a brown or greyish covering. (See cut on opposite page).

Occurrence: General throughout the Province, especially in gardens and waste places.

Eradication: This weed will not give a great deal of trouble in well cultivated land. A good summer-fallowing every two or three years will have a good effect. Harrowing the crop after it is up two or three inches, from one to three times, is one of the best methods of controlling this weed.

Crop rotation including seeding to grass for a year or two will practically exterminate it. As this weed is generally found around yards, gardens and stack bottoms, a scythe should be used frequently so as not to allow any plant to produce seed. It is from such places that the majority of farms are overrun with this weed.

The seed of Lamb's Quarters is a very common impurity in both grass and cereal seed, therefore careful attention should be given to the seed sown.

Sheep will help to control this weed.

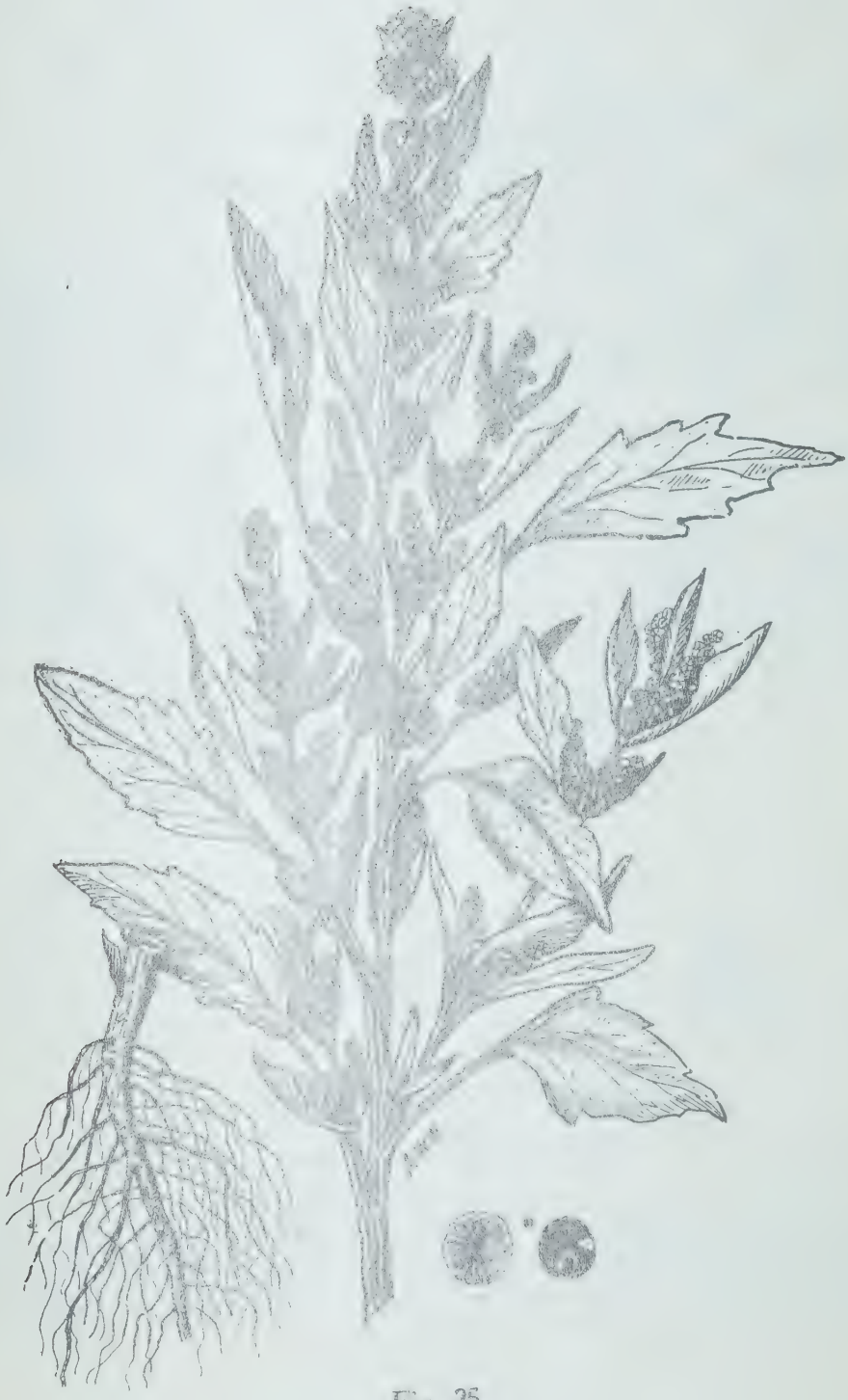


Fig. 25

LAMB'S QUARTERS
(*Chenopodium album* L.)

SPEARLEAF GOOSEFOOT

(*Monolepsis chenopodiodes, Moq.*)

A native annual with low spreading habits of growth. The whole plant is dark green in color, resembling Lamb's Quarters to some extent. The leaves are spear-shaped and fleshy. The flowers are borne in the axils of the leaves and are quite inconspicuous.

It occurs throughout the Province, along roadsides, in waste places, and in gardens.

Eradication: When it is found growing in gardens, and along roadsides, cut with a hoe before the plants go to seed. When found in grain fields, the usual methods advised for the destruction of annuals will hold it in check.

MAPLE-LEAVED GOOSEFOOT

(*Chenopodium hybridum* L.)

Annual with large, bright green coarsely toothed leaves. Resembles Lamb's Quarters very much in general habits of growth. Occurs in waste places and sometimes in grain fields in various parts of the Province.

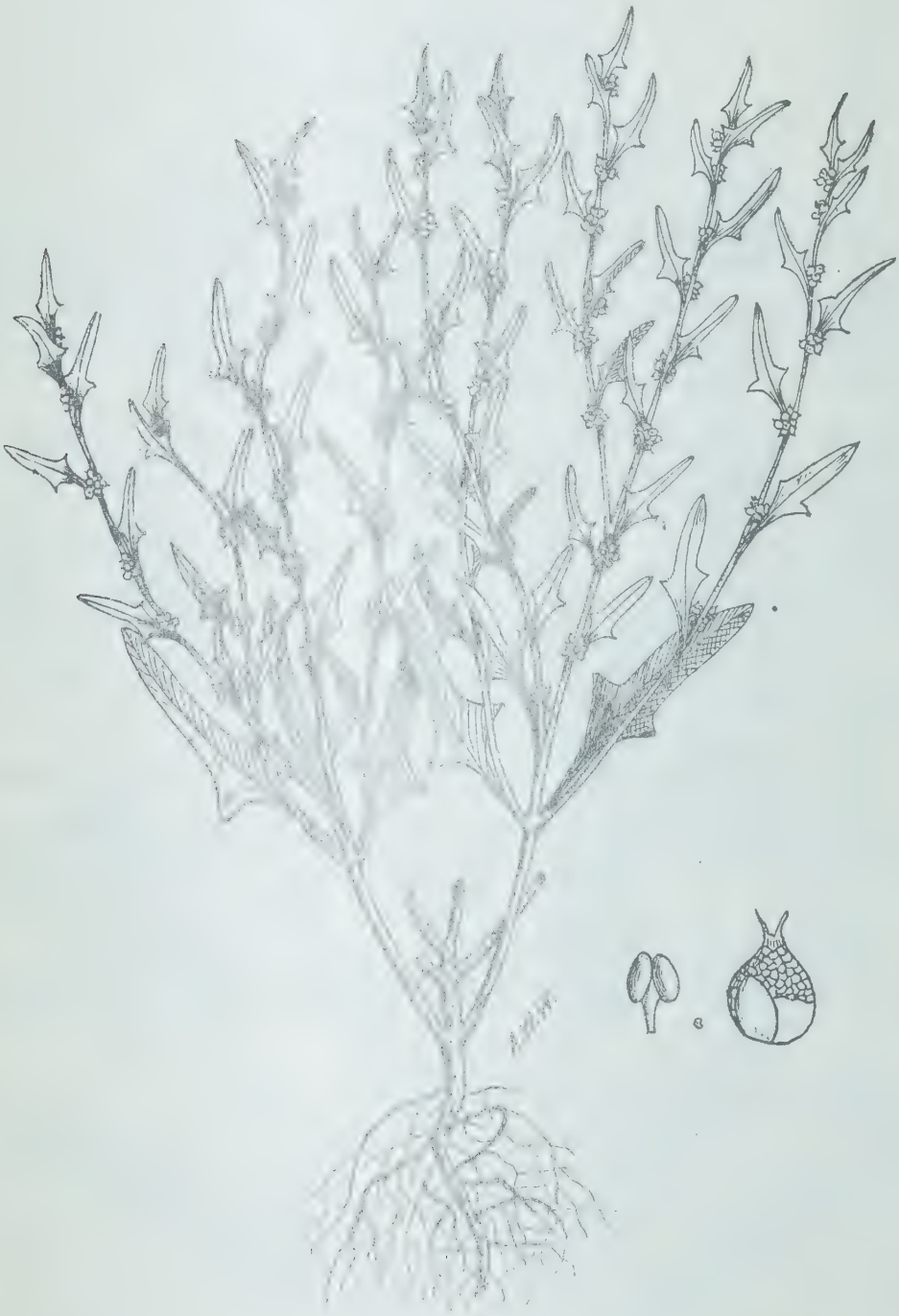


Fig. 26

SPEARLEAF GOOSEFOOT

(Monolepsis chenopodiodes moq.)

RUSSIAN PIGWEED

(*Axyris amarantoides* L.)

Annual of European origin; grows erect from one to four feet high, is much branched and very leafy; leaves and entire plant are of a soft green color; flowers inconspicuous and pale yellow in color. The whole plant when full grown forms a large pyramidal compound raceme, and when matured is of a light golden color.

This weed is a rank grower and produces a large number of seeds. It is not very prevalent as yet in this Province, but is gradually gaining a foot-hold. When it occurs in grain crops it crowds out the grain and gives trouble at harvest time, interfering with the working of the binder. "Farm Weeds of Canada," makes the following statement regarding this weed: "It is important that this weed should have every attention as it has every characteristic of an aggressive enemy."

Time of Flowering: June to July. Seed ripe July to August.

The Seed: (Plate 1, Fig. 7) is about one-twelfth of an inch long, a greyish-brown in color, surface minutely lined and wrinkled lengthwise.

Occurrence: In small patches throughout the Province, mostly along railways, and around the feeding camps of construction outfits.

Eradication: Such methods as were recommended for the eradication of Lamb's Quarters will prove very effective for this weed, as the habits of both are quite similar. Indications are, however, that Russian Pigweed is much more difficult to handle, therefore, instead of being cut off at the ground, it should be hand-pulled, piled in heaps and burned. Where Timothy is grown to check this plant it should be either cut early or pastured the first year.

Keep the road allowances and edges of fields clean.

Fig. 27
RUSSIAN PIGWEED
(*Axyris amarantoides* L.)

Fig. 28
REDROOT OR PIGWEED
(*Amaranthus retroflexus* L.)

PIGWEED FAMILY

(*Amaranthaceæ* L.)

REDROOT OR PIGWEED

(*Amaranthus retroflexus* L.)

Annual of European origin. Erect-growing plant, usually much branched; leaves egg-shape and borne on long stocks or pedicels, each leaf tipped with a bristle, stems covered with coarse hairs. The whole plant is light green in color, with the exception of the long [illegible] which is a pale pink, and from which the weed derives the common name Redroot. Flowers green, borne on compound [illegible] in the axils of the leaves, and at the end of the branches. Individual flowers are inconspicuous.

This weed is not very troublesome in Alberta at the present time, yet it is gradually advancing. It is a gross feeder, and if at all thick will reduce the grain yield very much. The seed is often found in grass, clover and garden seeds. When found in seed by seed merchants it is scored as a serious impurity.

Time of Flowering: July and August. Seed ripe August and September.

The Seed: (Plate 1, Fig. 5) nearly black in color, shiny, oval and flattened on both sides.

Occurrence: A few scattered plants throughout the Province, these generally found along railways and around garden patches.

Eradication: Hand-pull young plants. To spud them is very effective because if cut below the crown they will die.

In spring, grain cultivate the land immediately after harvest and plough late that fall. In spring work early, well and reasonably late, then seed to barley or oats and cut for green feed. The life of Redroot seed is not more than from three to five years, therefore if a good crop rotation for that length of time is undertaken, there will be little further trouble with this weed.

This plant only spreads by seed, hence the necessity of cutting all plants around the fields, buildings, etc. If this is done for three consecutive years, few plants will make their appearance thereafter.

Harrow your spring grain.

Do not grow Fall Wheat.

TUMBLE WEED

(*Amaranthus græcizans* L.)

Annual. A low-growing, wide-spread, bushy plant. The stems are whitish, growing out from the base in such a manner as to make the plant spherical in form. Leaves are oval, gradually narrowed towards the base, dark green in color. The flower clusters are borne in the axils of the leaves, and are rather inconspicuous. When matured the whole plant is a golden yellow, very brittle, and will break off at the ground, often drifting many miles in the wind, spreading its seed as it goes.

Time of Flowering: July and August. Seed ripe August and September.

The Seed: (Plate 1, Fig. 4) nearly black, flattened on both sides, quite similar to that of Redroot.

Occurrence: Common in the southern and south-eastern parts of the Province.

Eradication: As this plant is very easily killed by frost, spring cultivation is more essential than fall cultivation. Harrowing the grain after it is up from one to three times will give the best results. Growing of Fall Rye for pasture is strongly recommended. Summer-fallow in bad cases.

Clean your seed thoroughly before sowing.

Fig. 29
TUMBLE WEED
(*Amaranthus graecizans* L.)

MORNING GLORY FAMILY

(*Convolvulaceæ*)

FIELD BINDWEED

(*Convolvulus arvensis* L.)

A creeping perennial of European origin with fleshy branching rootstocks which throw up slender stems at intervals. The stocks twine about other plants and spread over the soil upon which they are growing. Similar to Wild Buckwheat, but a much more troublesome weed owing to its perennial habit, and to the fact that it is propagated by means of its rootstocks. Leaves arrow-shaped, borne on rather long, slender stocks.

Flowers pink, resembling small Morning Glory flowers.

Seeds large, black and angular.

This weed has been reported recently at one or two points in the Province, and is very troublesome in some localities in Ontario.

Eradication: It is a very difficult plant to destroy owing to the vitality of its rootstocks. As this weed usually occurs in patches, thorough and continual cultivation with a wide-toothed cultivator throughout the growing season will exhaust the plants. Care should be taken, however, to clean the teeth of the cultivator when leaving a patch infested, as the roots dragged to other parts of the field will grow and spread the weed. If the patch is small it is possible to smother by covering with a straw stack or with manure to a depth of several feet.

DODDER

(*Cuscuta Epithymum, Murr.*)

An annual plant with parasitic habits. It has slender, yellowish and reddish stems which twine about the clover or alfalfa plants attaching itself to them by means of suckers through which it obtains its nourishment, sucking the juice from the plants to which it is attached. This is a very troublesome pest in alfalfa fields when it gets a start as it spreads rapidly from plant to plant until large areas of the field will have a burned appearance. Up to the present there is not a great deal of dodder to be found in Canada, outside of a small amount in Ontario. Certain sections of the United States as well as portions of Europe, where it has been necessary to purchase alfalfa seed, are seriously infested with it.

Eradication: Alfalfa fields should be watched closely, especially when seed has been secured from a foreign source, and when it is noticed infesting the plants, the infested crop should be cut and burned. In case a field is badly infested throughout it should be cut early for hay, before the dodder goes to seed, and then ploughed down.

Fig. 30
BINDWEED
(Convolvulus arvensis L.)

BUCKWHEAT FAMILY

(*Polygonaceæ*)

WILD BUCKWHEAT

(*Polygonum Convolvulus* L.)

Annual of European origin. A twining vine with branching stems and arrow-head-shaped leaves.

The flowers are borne in clusters in the axils of the leaves, and are greenish-white in color.

The seeds are dull black in color and triangular in form. They usually retain their outer covering, but this is sometimes removed, giving the seed a white appearance.

This weed is troublesome in grain fields throughout the Province. It twines around the stalks of grain, pulling them down and making it very difficult to bind the crop. It prevents lodged grain from rising, and reduces the yield and grade of grain. The seeds are very difficult to separate from grain, either in threshing or cleaning.

Eradication: Sow clean seed. Cultivate the land immediately after harvesting, so as to encourage the germination of the seeds on the surface. The young plants will be killed by the frost. Harrowing the grain after it is up will kill the seedling plants. Thorough summer-fallowing, ploughing before the plants go to seed, and cultivating with a duck-foot cultivator at intervals throughout the summer will rid a field of this pest.

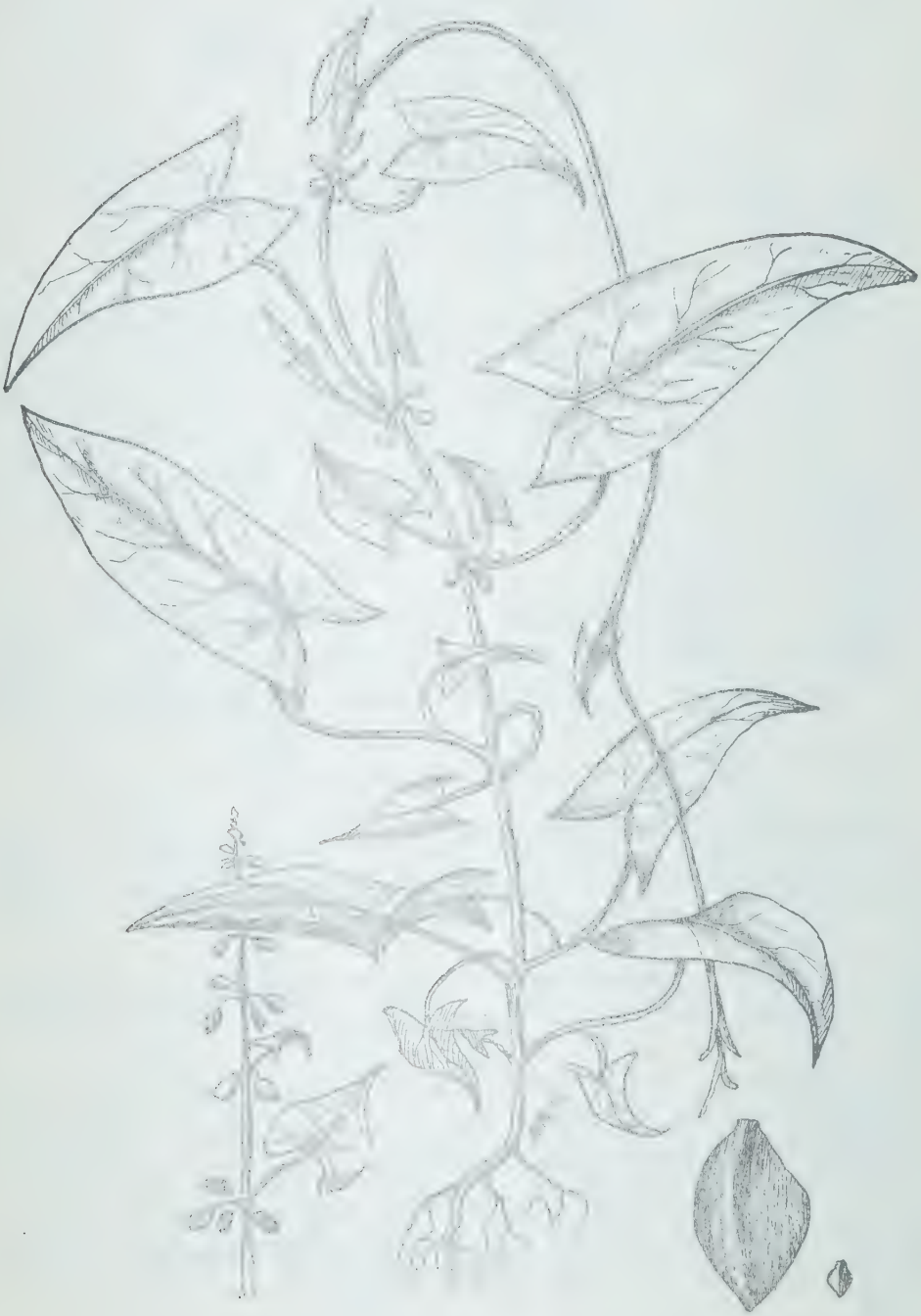


Fig. 31
WILD BUCKWHEAT
(*Polygonum Convolvulus* L.)

PINK FAMILY

(*Caryophyllaceæ*)

PURPLE COCKLE OR CORN COCKLE

Agrostemma Githago L.

Annual and winter annual, introduced into Canada from Europe. Erect-growing plant, usually from one to three feet high, with few branches. Leaves two to five inches long, narrow and pointed. Both leaves and stocks are covered with soft, silky hairs. Flowers purple, borne at the tips of the stems and branches, about one inch and a quarter across. Fruit capsule ovid, with fine teeth at the apex.

Very common weed in wheat fields. When ground with wheat, the seeds give a bad flavor and a dark color to the flour. It has been known to poison young chickens when eaten in large quantities.

Time of Flowering: July. Seed ripe in August.

The Seed: (Plate 1, Fig. 6) is about one-fifteenth of an inch in diameter, somewhat flattened, rounded triangular, rough, covered with rows of sharp teeth, solid black in color.

Occurrence: More or less throughout the Province, especially where fall wheat has been grown to any extent.

Eradication: Sow clean seed and hand-pull when there are only a few plants in the crop. In cases where there is much of this seed in the soil, spring ploughing followed by a thorough cultivation will destroy any of the plants which may have started in the fall and have lived through the winter. If the land is badly infested, summer-fallowing is the most effective remedy.

Avoid growing fall wheat where this weed is troublesome, as the plants will have such a firm hold in the spring that it will be difficult to affect them by harrowing. Grow spring crops and harrow the growing grain to kill the seedling weeds.

Fig. 32
PURPLE OR CORN COCKLE
(*Agrostemma Githago* L.)

If the land is badly infested, cultivate immediately after harvesting in order to germinate the seeds on the surface. Cultivate the land early in the spring to start the weeds as soon as possible. Plough quite deeply in June. Harrow immediately after ploughing and at intervals throughout the summer each time the weeds appear.

Hand-pull any seed-bearing plants in the crop the following year.

COW COCKLE

(*Saponaria Vaccaria* L.)

Annual. Introduced from Europe. It grows from one to three feet high. Stems eract, branching above, or much branched from the base. The whole plant is smooth, succulent, and of a greyish-green appearance, like the leaves of a cabbage. Flowers pink, about half an inch in diameter, calyx ovate, inflated and finely ribbed. The flowers are succeeded by smooth, rounded capsules containing about twenty seeds each.

This weed is becoming quite a serious pest in this Province, especially in wheat-growing districts. It is a vigorous grower, and robs the crop of moisture as well as crowds out the grain. It is also very objectionable as an impurity in seed, and to the miller who is purchasing wheat for flour.

Time of Flowering: July. Seeds ripe in August.

The Seed: Is about one-twelfth of an inch in diameter, round, finely pitted, and a dull black in color. This seed is often confounded with the seeds of wild vetch.

Occurrence: General throughout the Province, especially in the grain-growing districts.

Eradication: Sow clean seed. On account of its peculiar appearance it can be easily seen and hand-pulled when the plants are not too thick. Fall and spring cultivation will do much to hold it in check. Seeding to timothy and leaving for two or three years usually has the effect of reducing the number of plants. Thorough summer-fallowing is also effective.

(See system of eradication recommended for Purple Cockle.)

Fig. 33
COW COCKLE
(*Saponaria Vaccaria* L.)

WHITE COCKLE

(*Lychnis alba Mill*)

Biennial, introduced from Europe; with hairy and branching stems from one to three feet high. Leaves are oblong with acute tips. Flowers are in loose panicles, usually white in color, and about three-quarters of an inch across.

Time of Flowering: June and July. Seed ripe July and August.

The Seed: Is a pale grey in color, and kidney-shaped with tubercles regularly disposed over surface.

Occurrence: Only a few plants have been found in Alberta thus far.

Eradication: Hand-pull when first noticed. Do not grow Winter Wheat. This weed is generally introduced into new countries through seed grain, therefore inspect all seed before sowing.

STICKY COCKLE OR NIGHT-FLOWERING CATCHFLY

Annual of European origin. An erect growing plant from one to three feet high, somewhat branching. Lower leaves ovate, narrowed at the base, stem leaves lance-shaped. Flowers few, about one inch across, whitish-yellow on the outside, and a pinkish color inside. The whole plant is covered with soft hairs, which make it objectionable to live stock, either green or cured in hay. This plant may be easily distinguished from the other cockles by rubbing the plant between the hands, as it throws off a sticky substance, which no doubt has been responsible for the common name, Sticky Cockle.

Time of Flowering: June to August. Seed ripe July to September.

The Seed: Is similar to that of the Bladder Campion, only not so large. It is greyish-brown in color, with a tiny black tip to each tubercle.

Occurrence: A few plants in Southern Alberta.

Eradication: Sow clean seed. Hand-pull when possible. See eradication of Purple Cockle.

BLADDER CAMPION

(*Silene latifolia, Mill Britten and Rendle*)

Perennial. Introduced from Europe. It is a deep-rooted, freely branching weed, growing from one to two feet high. The leaves are ovate, lance-shaped, smooth, in pairs with their bases meeting around the stem. Flowers white, about one inch across, and borne in loose clusters which are often drooping.

Time of Flowering: June and July. Seeds ripe July and August.

The Seed: is about one-sixteenth of an inch across, irregularly kidney-shaped, light brown to dark grey in color, the surface covered with regularly arranged rows of tubercles.

Occurrence: A few plants in Southern Alberta.

Eradication: Dig up any plants found. Deep cultivation is necessary to combat this pest. Use the wide-shear cultivator if possible. This is a troublesome weed when once well established, hence too prompt attention cannot be given to stray plants.

BORAGE FAMILY

(*Boraginaeæ*)

BLUE BUR OR STICKSEED

(*Lappula echinata Gilbert*)

Other names: Sheep Bur, Stickweed.

Annual and winter annual of European origin. Erect, branching, whole plant thickly covered with coarse hairs. Both stems and leaves have a greyish green appearance. Leaves linear, oblong, basal leaves without stems. Flowers small, about one-eighth of an inch across, pale blue in color, arranged in long, somewhat one-sided clusters.

Owing to the stubbling in of a great deal of crop throughout the Province this weed has become quite a serious pest. It has an objectionable odor. Stock will not eat it. The bur of this weed is very troublesome to sheep on account of the fleeces becoming matted with it.

Time of Flowering: June to August. Seeds ripe July to September.

The Seed: (Plate 2, Fig. 17) is about one-eighth of an inch long, greyish-brown in color, and pear-shaped. Margin covered with hooked spines.

Occurrence: More or less throughout the Province, quite common in districts where the stubbling in of grain has been practised.

Eradication: Occasional plants should be hand-pulled. Badly infested fields should be summer-fallowed. Grain should not be sown on stubble land that is in any way infested with this weed. To cultivate land immediately after harvest and plough the same fall will give good results. For spring work the wide-shear cultivator should be used, as this implement will destroy many of these plants that have lived through the winter, and which are not likely to be destroyed by the disc.

All plants around buildings, stack-bottoms and the edges of fields should be cut close to the ground with a scythe.

It is important to sow clean seed.

Fig. 34
BLUE BUR STICKSEED
(*Lappula echinata Gilbert*)

EVENING PRIMROSE FAMILY (*Onagraceæ*)

WHITE EVENING PRIMROSE (*Oenothera pallida Lindl*)

Tall growing, native perennial with large, fleshy, creeping roots, which throw up flower stems at short intervals. These usually grow singly, erect, to a height of about three feet, and are white in color, thinly covered with down at the top. The leaves are long, narrow and bright green.

Flowers large and white, formed in axils of leaves.

Not prevalent, though it has been observed in various parts of the Province.

Eradication: Summer-fallowing with thorough cultivation throughout the summer.

MINT FAMILY (*Labiatæ*)

HAIRY MINT OR HEDGE NETTLE (*Stachys palustris* L.)

Found growing in low land, is pale green in color, stems and leaves hairy. Leaves large and opposite.

Flowers lavender in color, perennial in its habits, with creeping roots. It has been known to give trouble in grain crops in the central portions of the Province during wet seasons.

Eradication: Summer-fallow with thorough cultivation.

ROSE FAMILY (*Rosaceæ*)

PRAIRIE ROSE (*Rosa Arkansana, Porter*)

A native perennial found growing on the unbroken prairie in practically all parts of the Province. An extensive description of this plant is unnecessary, as it is familiar to almost every person. In general appearance it resembles the other members of the rose family. Its delicate pink flowers with their odor serve to identify it to the most casual observer. The prairie rose sometimes proves troublesome on land which has not been properly broken.

Eradication: In this case the land should be summer-fallowed, ploughing fairly deep and using a sharp share. Cultivate thoroughly throughout the season with a spring-tooth cultivator. This method followed by ploughing the land put into crop each year will thoroughly eradicate this plant.

HONEYSUCKLE FAMILY (*Caprifoliaceæ*)

WESTERN SNOWBERRY OR WOLFBERRY
(*Symphoricarpos occidentalis, Hark*)

A native shrub growing from two to three feet high on the unbroken prairie; is only troublesome as in the case of the rose when breaking has not been thoroughly done.

Eradication: Clean summer-fallowing.

POISONOUS WEEDS

THE PARSLEY FAMILY

(*Umbelliferæ*)

SPOTTED COWBANE OR WATER HEMLOCK

(*Cicuta maculata* L.)

A native perennial growing from two to five feet high. Stems coarse, erect, hollow, branching freely. Pale green in color with streaks of purple. The roots are fleshy and in clusters. Leaves are double, compound, clasping by an expanded base. The leaflets are long, narrow, and finely toothed along the margins. The flowers are small, greenish-white, and borne in compound umbrella-like clusters on the tips of short branches.

Both the stock and leaves of this plant are poisonous to some extent, but it is generally the lower leaves and the roots that prove fatal to live stock. In the spring these roots are more poisonous than at any other season of the year, and as this plant generally makes its growth before other plants or grasses in the spring, stock will often eat it to satisfy their hunger, and death results almost immediately.

Time of Flowering: July to August. Seed ripe August and September.

Occurrence: General throughout the Province, but confined to low or wet lands. Quite common in sloughs and marshes.

Eradication: As this plant is found in wet lands hand pulling is the most effective method of eradicating it. When hand-pulled the work can be more easily done by first loosening the roots with a spade. Be careful to carry all plants to a dry place where no stock can reach them and where they can be burned when dry. Do not leave the pulled plants on the ground or in the water as the water may be contaminated with poisonous principle, called cicutoxin.

In cases where hand pulling is impossible, fence the areas so that no stock can pasture there.

Fig. 35

SPOTTED COWBANE OR WATER HEMLOCK

(*Cicuta maculata* L.)

THE BUTTERCUP FAMILY

(*Ranunculaceæ*)

TALL LARKSPUR

(*Delphinium*)

A native perennial of rank growth from two to five feet high. The stem is usually unbranched, and the lower two-thirds is leafy, but the upper portion forms a large, loose flower spike. Leaves large, especially those near the base, rounded in outline, but deeply cleft; upper ones small linear. Flowers purple or blue, and borne on a flower spike from six inches to one foot long. The lower flowers generally are matured before the upper ones come into bloom.

Both the roots and top of this plant are poisonous to farm stock, and have been known to kill animals in a very short time. Although indications are that it is not so harmful as the Water Hemlock, from reports it is evident that more stock is poisoned yearly by Larkspur. This, perhaps, is due to the extra early growth, which results in its being green before other plants or grasses, thus attracting the animal.

Time of Flowering: July to August. Seed ripe August and September.

Occurrence: Generally found in low, wet lands. Quite common along the foot-hills and in Northern Alberta.

Eradication: As this plant is a perennial, cutting does not kill it, although it may be a good preventative in the early spring. The plant should be pulled and taken care of as mentioned for Water Hemlock. If impossible to handle this way then fence the infested area so that no stock can reach it.

You may look for this plant as soon as the snow is gone.

Fig. 36

TALL LARKSPUR

(*Delphinium*)

THE BUNCHFLOWER FAMILY

(*Zygadenus*)

DEATH CAMAS

(*Zygadenus venenosus Wats*)

Native, biennial, growing from one to two feet high. Leaves long and slender, almost grass-like, which grow in dense clusters from the root bulbs below the surface of the ground. The flower stem grows from the centre of the leaf cluster and is unbranched, bearing numerous flowers one-fourth of an inch across, yellowish-white in color. The root has a bulb-like appearance, and is often mistaken for that of Wild Onion.

Both the leaf and root of the plant are deadly poisonous when green and succulent. It is relished by farm stock and is the cause of many dying, especially sheep. Animals affected by this weed act in a crazy manner, hence it is commonly known in the ranch country as Crazy Weed.

Time of Flowering: May and June. Seed ripe June and July.

Occurrence: More or less throughout the Province. Quite common in the foot-hill districts and western range country.

Eradication: As this weed exists only in uncultivated districts no system of eradication can be recommended other than that of digging it out wherever found. It is often found in patches, yet individual plants may be growing over the entire range. In cases of patches it can be killed by cultivation or smothering. In cases of individual plants spudding is best.

Fig. 37

DEATH CAMAS

(*Zygadenus venenosus Wats*)

THE PEA FAMILY

(*Leguminosæ*)

WHITE LOCO

(*Aragallus Lambertii, Greene*)

A native perennial which propagates by seed only. It grows from six to ten inches high, stemless, with compound leaves, which are grey in color from the presence of many whitish hairs. The flowers are borne in clusters at the top of a slender, leafless, unbranched stalk, and are generally a yellowish-white in color, yet in some cases they are to be found of a bluish-purple.

The flower resembles a great deal that of the common pea. The root is strong and fibrous, which is protected by a large crown, and from which a new crop of leaves and flower-stocks are produced each year.

This plant appears to be most poisonous when in flower, and it is at this stage that stock take to eating it. Live stock in a general way will not eat Loco Weed. It appears that perhaps only one animal in the herd will start, then from the peculiar actions of the animal which is affected by the poison, other animals will imitate until a large number are affected.

Time of Flowering: Latter part of May and during June. Seed ripe July.

Occurrence: Common in the prairie districts, especially along the foot-hills.

Eradication: In cases of large ranches nothing can be done but to grub individual plants off just below the crown. Mowing off above the ground will not kill them. In small patches or in districts where the land can be brought under cultivation this weed will give little trouble.

Parties wishing further information regarding poisonous weeds should communicate with Dr. P. R. Talbot, Provincial Veterinarian, Department of Agriculture, Edmonton, Alberta.

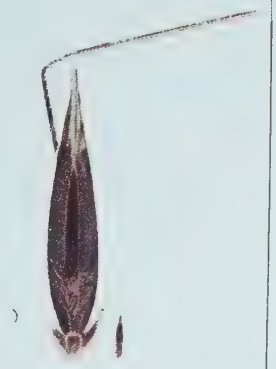
Fig. 38

WHITE LOCO

(*Aragallus Lambertii, Greene*)

PLATE I.

1

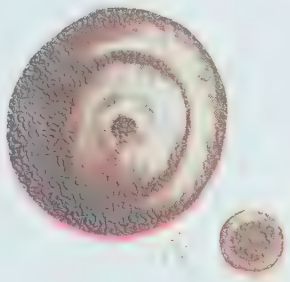


Wild Oat

2

Hairy Wild Oat

3



Russian Thistle

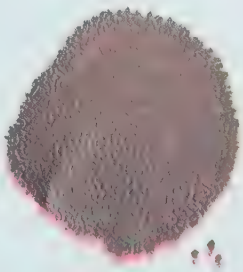
4

Tumble Weed

5

Red Root

6



Purple Cockle

7

Russian Pigweed

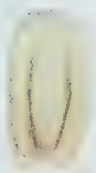
8

Stink Weed

9

Shepherd's Purse

10



Tumbling Mustard

11

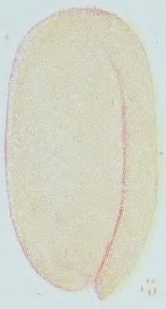
Tansy Mustard

12

Wormseed Mustard

PLATE 2

13

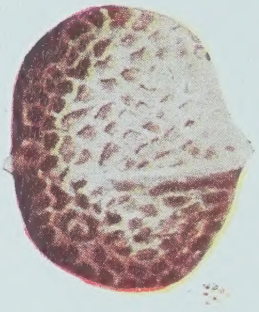


Western False Flax

14

Hare's Ear Mustard

15

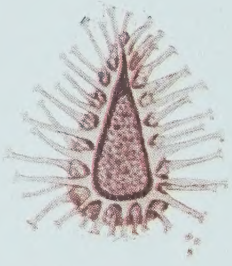


Ball Mustard

16

Wild Mustard

17

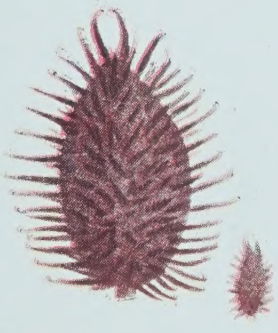


Blue Bur

18

Rag Weed

19



Cockle Bur

20

Canada Thistle

21

Prickly Sow Thistle

22

Perennial Sow Thistle

23

Blue Lettuce

24

Small Seeded False Flax